THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888

No. 1. JANUARY 8, 1953 VOL. 65.

EXPERIMENTS ON METHODS TO CONTROL THE SPREAD OF *STREPTOCOCCUS AGALACTIAE* IN A DAIRY HERD*

BY

DAVID LESLIE HUGHES

BOOTS PURE DRUG CO., LTD., VETERINARY SCIENCE DIVISION, RESEARCH DEPARTMENT, THURGARTON, NOTTS

All countries in which dairying is a substantial part of agricultural economy suffer from the problem of mastitis in their dairy cows. Although estimates of the economic loss caused by mastitis must of necessity be only approximations, figures calculated by the National Veterinary Medical Association of Great Britain (1941), in their Report on the Diseases of Farm Livestock, place the loss of milk in England and Wales due to mastitis at 48,000,000 gallons. At present prices this represents a loss of between £5,000,000 and £7,000,000. Further loss will result from the need to replace cows and the indirect loss of calves which would otherwise have been born.

A number of bacteria are recognised as causes of mastitis in the cow ; of these *Str. agalactiae* has received the most attention, but the relative importance of this organism as a cause of mastitis in the dairy herds of this country is not easily determined. Its prevalence may be assessed in two ways, firstly by bacteriological herd surveys of representative herds, and secondly, by determining its frequency in samples taken from clinical cases of mastitis.

Recent herd surveys have been made by the author, Hughes (1948), and latterly by Wilson (1952). Hughes' (1948) survey included seven herds in Berkshire and Hampshire which were examined in 1944-45 ; in these herds a total of 268 cows were tested of which 159 were found to be infected with *Str. agalactiae*, an incidence of 59·3 per cent. An extension of the survey to the north-east Midlands in 1946-48 sampled 19 herds containing a total of 591 cows ; 91 cows yielded *Str. agalactiae*, an incidence of 15·2 per cent. Wilson (1952), in a much more extensive sampling in the South of England, examined 4,636 cows in Surrey and found 657 infected, an incidence of 14·2 per cent. The figures for Herts were 15·1 per cent. as 347 were infected in a total of 2,292 cows sampled.

The problem of the relative importance of different bacteria in mastitis may be assessed in another manner —by the bacteriological examination of samples of secretion from cases of mastitis. Unpublished data collected by the author from bacteriological examination of samples taken from every case of mastitis seen in one veterinary practice over the three years 1949-51, confirmed the importance of *Str. agalactiae*. Out of the 1901 cases examined this organism was recovered 548 times, an incidence of 28·8 per cent. *Str. agalactiae* was the organism isolated most frequently. Berger & Francis (1951), in a similar survey, found 46 per cent. of *Str. agalactiae* infections in 285 cases examined in 1946.

Although the exact extent of infection with this organism in the country as a whole may be uncertain, there can be no doubt that mastitis caused by it is one of the outstanding problems of the dairy industry. Certain other forms of mastitis may be more important than at one time they were thought to be, but *Str. agalactiae* infections are still responsible for a heavy toll on the dairy cow's udder. Furthermore, nearly all workers on the problem are agreed that *Str. agalactiae* mastitis differs from other infections of the udder in that it is contagious.

Much of the practical advice given to farmers in the last 30 years has stressed the need for hygienic measures in mastitis control, but most of this advice was based on intelligent guesswork. It is only in the last 10 years that there have been observations and experiments on how hygienic methods might influence the incidence of mastitis in herds. Concentrated efforts to this end were made the subject of group study by a team of workers, including the author, who published their results as " Modes of Spread of *Streptococcus agalactiae* in Dairy Herds," Imperial Bureau of Animal Health (1944), *Review Series No. 2.* Their studies led to the conclusion that the main reservoir of *Str. agalactiae* is in, or on, the bovine udder, and that, if infection from this source could be eliminated, mastitis due to this particular organism might be controlled effectively.

From these observations and others of my own, it is believed that the main vehicles of transmission of this organism must be those which pass regularly from one udder to another during the milking process, and these are (i) udder washing cloths and udder washing water ; (ii) milking machine teat cups ; and (iii) milkers' hands, Hughes (1949).

The present studies were undertaken to try to define a milking technique capable of controlling the spread of *Str. agalactiae* from cow to cow. After such a technique had been found it was then broken down in stages in an attempt to demonstrate which factors in a milking routine were conducive to the spread of this organism. It must be emphasised that these studies refer to the spread of the organisms rather than to the presence of clinical mastitis and in point of fact few cases of mastitis occurred throughout these observations.

There are many pitfalls in studying a contagious disease in an environment already infected before the observations commence, and it was for this reason that these studies were made on an experimental basis in a herd which was gathered together for the purpose.

In September, 1946, 10 non-pedigree in-calf heifers —eight Ayrshires and two Shorthorns—were purchased and brought to the Veterinary Science Division's Checkers Farm, Thurgarton. These heifers all calved within two months of each other and were the foundation of the herd. The herd was self-contained as recruits to the herd were daughters of the foundation cows. The only exceptions to this rule were when two cows which were free from *Str. agalactiae* were brought in from one of Boots' other farms. The herd was in the charge of one man throughout the four years ; he was responsible for all operations in the herd, and he was relieved only on his holidays and half-days. The herd was under veterinary supervision, and kept under good condi-

* Part of a thesis approved by the Royal College of Veterinary Surgeons for its award of the diploma of Fellowship.

tions of general management. Milking was by the bucket unit type of milking machine, and it took place in a cow byre. During the winter the cows were kept in a half-covered open yard.

Methods

The herd was sampled every week during the four years of observations. Samples were taken immediately after udder washing at the afternoon milking.

Each herd test comprised teat swabs (one per cow), milk samples (one bottle per quarter) and samplings of the milker's hands.

Technique of Sampling

All samplers wore rubber gloves which were rinsed in hypochlorite solution between cows. The gloved hands were then dried with a wrung-out cloth which was immersed in the hypochlorite when not in use.

1. *Teat Swabbing.*—The swabs were of absorbent cotton wool wrapped round the ends of thick glass rods which were sufficiently long to be handled without contaminating the wool or the medium to be inoculated. The swabs were moistened with sterile tap water. then with the left hand the tip of the teat was grasped and pulled down, and with the right hand the teat swab was rubbed briskly five to six times up and down against the anterior and posterior surfaces of the teat from 1 inch above the tip of the teat up to include 1 inch of the surface of the udder. The teats nearest the operator were swabbed first. One swab was used for all four teats. Immediately after contact with the teats the swab was immersed in 10 ml. of sterile skimmed milk in a 25 ml. McCartney bottle and rotated 10 to 12 times. The swab was then withdrawn, at the same time expressing the excess liquid from the swab against the neck of the container before replacing the screw cap.

2. *Milk Sampling.*—Immediately after the teats were swabbed a second person took milk samples. The teat orifices were cleansed with sterile cotton wool plugs soaked in 50 per cent. alcohol. The teats farthest from the sampler were cleansed first, and the samples were then withdrawn from the nearest teats. This method avoided the accidental touching of the teat orifices with the wrists before sampling, which may occur when sampling in the reverse order. The first two or three streams of foremilk were rejected into a strip cup, which was examined for abnormalities of milk, and approximately 20 ml. of milk from each quarter were drawn into separate sterile McCartney bottles.

3. *Hand Sampling.*—Throughout these studies a modification of Harrison's (1941) technique has been used.

Before the hands were sampled they were rinsed in tap water to free them of gross dirt, but they were not dried. Using a sterile nail-brush, the palms, fingers, thumbs, backs of hands and wrists were scrubbed for one and a half minutes in a sterilised enamel bowl containing 500 ml. of sterilised skimmed milk. Particular attention was paid to the nails.

Laboratory Methods

1. *Teat Swabs.*—Immediately on arrival at the laboratory the teat swab samples were placed in the incubator at 37° C. and incubated overnight. Next morning they were removed from the incubator, shaken and stroked on to the surface of Edwards's crystal violet aesculin blood agar containing 1/2,000 thallium acetate. The loop used for stroking was 1 mm. in diameter and the stroking was performed in a standard manner, one preliminary stroke and 10 to 12 cross strokes with a fresh loop.

2. *Milk Samples.*—Milk samples were inoculated. within one to two hours of their collection, directly on to the surface of ox blood aesculin agar. The inoculum was three drops of shaken milk dropped on to the surface of the medium from a 30 dropper pipette, an inoculum equal to 0·1 ml. of milk. The plate was rotated and tilted to spread the inoculum over the surface—these comprised the direct milk samples. The milk samples were then placed in a 37° C. incubator overnight and stroked out next morning on to Edwards's crystal violet aesculin blood agar containing 1/2,000 thallium acetate—these samples will be referred to as the enriched milk samples. The stroking was done in the same way as for teat samples.

3. *Hand Washes.*—Ten ml. of the sterilised milk used for hand scrubbing were removed and centrifuged at 2,500 r.p.m. for 10 minutes. Two ml. of sterile Ringer's solution were added to the deposit, shaken, and 0·5 ml. of the suspension plated deeply in Edwards's crystal violet aesculin blood agar containing 1/2,000 thallium acetate.

All plates were incubated for 48 hours when they were examined for colonies likely to be those of *Str. agalactiae*. Suspicious colonies were picked into 10 to 15 ml. amounts of glucose broth and incubated overnight at 37° C. Final identification was by the precipitin test with streptococcal group B serum. The extraction was by the hot acid method originally described by Lancefield. Positive serological tests were confirmed by biochemical tests with aesculin, sodium hippurate, mannite, inulin and raffinose. An ability to hydrolyse sodium hippurate with no change in the other substrates was considered as sufficient evidence that the organism was *Str. agalactiae*, if the organism was serologically positive. Any other organisms isolated from milk samples were also identified, but their presence is not relevant to the present record.

The following procedures were adopted as the standard milking methods in the Checkers herd; they were varied and adapted in each experiment in such a way as to try to define what particular vehicles were important in the spread of *Str. agalactiae*.

Udder Washing.—The udders were washed by the hot cloth technique immediately before milking, as advocated by Peterson (1944). The water for udder washing was heated in an electric copper, the water being drawn off by means of a tap. A separate sterile udder cloth was used for each cow. The cloths were wetted under the tap of the copper (Fig. 1), used wet and then wrung out to dry the udder.

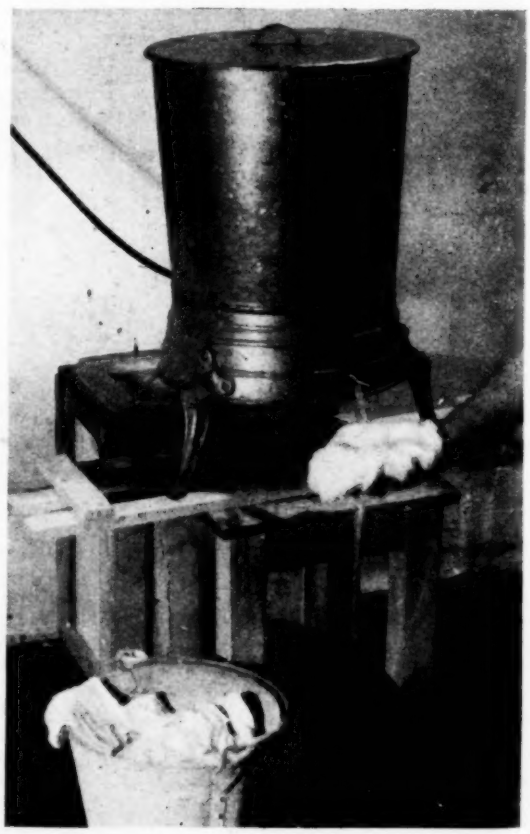

Fig. 1.—Preparation of udder cloths for udder washing.

Teat Cups.—Each milking machine bucket was provided with two sets of teat cups, cluster and milk pipe line. A tank leading to a gravity feed pipe was devised to ensure adequate contact of the hypochlorite solution with the interior of the teat cup liners and milk pipe line. This tank was placed on the wall and from it a pipe led to a T piece. Level with the T piece were two brackets attached to the wall. These brackets held a set of teat cups each. The milk pipe line was attached to one end of the T piece and a tap on the T piece was opened. This allowed hypochlorite solution to flow down from the tank through the pipe line and up to the level of the teat cup lips; the tap was then closed. The T piece and two brackets allowed two sets of teat cups to be treated at the same time (Fig. 2).

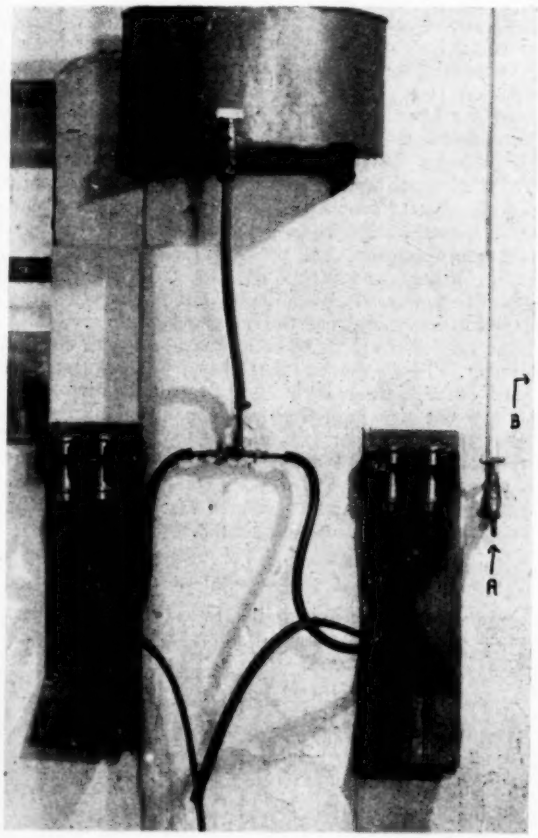

Fig. 2.—Disinfection of milking machine teat cups between milking cows.

As a set of teat cups was taken off a cow it was disconnected from the milking machine bucket, attached to a water tap on the wall (A) to flush out residual milk, then placed in the bracket, connected to the T piece and the hypochlorite allowed to run in to the level of the teat cup lips. The teat cups were left in the bracket for as long as it took to milk the next cow with the alternate set of cups; this period was on the average four to six minutes. Throughout these experiments hypochlorite solution refers to a solution containing 800 p.p.m. of available chlorine.

After detachment from the hypochlorite system the milk pipe line and cluster were attached to tap B on the wall and flushed with water to remove any remaining hypochlorite solution. Thus tap A was regarded as a "dirty" or "infected" tap and tap B was considered "clean."

Hand Stripping.—No hand stripping after machine milking was allowed and a general instruction was given that cows' udders were to be handled as little as possible. There was one exception to this rule; immediately after calving, calves were allowed to suckle their mothers for three to four days. In certain heavy milking cows the calf was unable to deal with all its mother's milk, and in such cases the cowman was instructed to remove the excess milk by milking the cow. When this procedure was necessary, the milker wore rubber gloves.

These methods comprised the basic routine of milking management in the herd.

RESULTS

From December, 1946, to October, 1947, the herd was kept under bacteriological observation, by weekly tests, to provide definite evidence that it was free of any natural infections with *Str. agalactiae.* *Str. agalactiae* was not isolated from any of the cows in the herd during this period.

After 10 months it was felt that this series of negative tests provided an adequate base line for future experiments. At this stage it was necessary to obtain a source of *Str. agalactiae* infection. A cow, Ladybird, was purchased from the Agricultural Research Council's Field Station at Compton. This cow had a history of continuous infection with *Str. agalactiae* since 1942. She was brought to Thurgarton and placed in isolation for two months. As the cow was in milk it was necessary to milk her with a separate milking machine, but unfortunately, owing to shortage of labour, the cowman in charge of the main herd had also to look after Ladybird, and on two occasions his hands became contaminated with *Str. agalactiae.* On each occasion his hands were cleared of infection by the application of penicillin ointment.

On October 20th, 1947, Ladybird was introduced into the main herd and Experiment 1 commenced.

The results of the experiments in the Checkers herd are presented by means of tables, graphs and figures. In the tables there is a brief summary of the milking technique under test at the head of the table, the results being presented by weeks for each cow, and totalled in various ways at the foot of the column for each week. In these total results at the foot of the column no distinction is made between teat positive, enriched milk or direct milk positive. Recovery of *Str. agalactiae* from any of the samples taken from a cow is recorded as positive. The same criterion holds for the graphs, which express the cumulative positive percentage results. However, in the data of the individual cows, both in the tables and the figures, more detail is given of the source of recovery of *Str. agalactiae.*

The totals at the bottom of the tables are the total number positive over the total number tested, the percentage positive at that test, the number of new positives at each test, the cumulative number positive—that is the number of cows which up to and including the test in question gave positive results on one or more occasions—and this figure is also expressed as a cumulative percentage of the total cows in the period of experiment. No cow is included in the figures of an experiment unless she was sampled in at least half the tests. The results of sampling the milker's hands are also included. The results of the samples from the infected "donor" are not included.

The "Donor" Cow.—It will be understood that during experiments as prolonged as these to be described, no one donor cow could provide a continuous source of infection. As soon as it was evident that Ladybird was becoming dry, her strain of *Str. agalactiae* was isolated by culture and transmitted to another cow by intra-teat inoculation. Two cows were infected artificially in the course of the experiments. One cow was injected with 5 ml. of an 18-hour meat broth culture up the teat canal, but this infection was thrown off in the course of a fortnight. Another cow was then injected by the technique described by Jones & Little (1934). A young meat broth culture (six hours) was

employed, a smooth glass rod dipped in the culture and the rod was inserted up the teat canal. The procedure was repeated on three successive days. The infection thus established was lasting. At no time was more than one "donor" cow placed in the herd, although later in the observations cows which contracted infection naturally were retained in the herd. No experiment commenced with more than one infected cow as the source of infection. Throughout all the experiments the strain of *Str. agalactiae* used to test spread of infection was the strain originally brought in by Ladybird. The "donor" cow was always milked first in all experiments.

Experiment 1

The technique under test was that described above, namely, one separate sterile udder cloth per cow, hot udder washing water containing no disinfectant, double sets of teat cups strictly disinfected and no hand stripping. Results are presented in Table I and Figs. 3 and 4.

It will be noted that one cow, Betsy, was teat positive at the very first test of the experiment. There is not much doubt that this was due to the fact that the cowman had had positive hands on two occasions when tending the donor cow, Ladybird, while she was still in isolation. This result was unfortunate but apparently it did not jeopardise the start of the experiment. There was no further evidence of spread from Betsy and her infection cleared without treatment, nor were the milker's hands positive at the start of the experiment.

However, on the ninth week Nannie was teat positive, and on the 10th week Helen was enriched milk positive. Two cows, Fairy and Betsy, were teat positive on the 11th week and the milker's hands were positive. With the exception of the next week, the 12th, his hands were continuously positive to the 21st week, and again in the last two weeks of the experiment, the 26th and 27th weeks. From the 17th week there was increasing evidence of spread within the herd. This rapid spread is well illustrated in Fig. 4 giving the cumulative percentage positives, which shows that from the 16th to 21st week every cow had been teat or enriched milk positive on at least one occasion. The technique was therefore not capable of controlling spread of *Str. agalactiae*, and it is probable that the breakdown was due to the milker's hands. It is interesting to note that in no other experiment were his hands positive, except on one occasion in Experiment 2, on the 13th week. During the course of Experiment 1, observations were made to see in what way his hands could have picked up infection. It became obvious that the washing-up of infected utensils was a likely source of infection and on one occasion it was noticed that he removed the filter pad from above the milk cooler after it was used and squeezed the surplus milk out with his hands before throwing it away. The filter pad was heavily contaminated with *Str. agalactiae*. It is suggested that washing-up and handling of contaminated apparatus is a likely source of hand contamination in a machine milked herd and it may be more important than the cows themselves.

In all further experiments the infected milk from the "donor" cow was thrown away, although the infected milking machine bucket had to be washed as usual.

At the end of the 27th week it was decided to close the experiment. There were no established udder infections in the herd—that is, there were no direct milk positive animals—so treatment was limited to the application of penicillin ointment (500 units per gramme) to the teats of all cows and the milker's hands twice daily for three successive days. Herd tests for the next six weeks were completely negative for *Str. agalactiae*. It was considered that this was adequate evidence that infection was eradicated.

Table I
Experiment 1
(One separate sterile udder cloth per cow. No disinfectant in udder washing water. Double sets of teat cups and strict disinfection)

Cow	No. of tests out of 27	Weeks																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Ann	16	/	/	/	/	/	/	/	/	/	/	/	0	0	0	0	0	0	0	0	0	+	0	+	0	0	+	+
Betsy	19	+	0	0	0	0	0	0	0	0	0	+	0	0	0	0	0	0	+	0	/	/	/	/	/	/	/	/
Clara	20	/	/	/	/	/	/	/	0	0	0	0	0	0	0	0	0	0	0	0	+	+	0	0	0	0	0	0
Fairy	18	/	/	/	/	/	/	/	/	/	0	+	0	0	0	0	0	0	+	+	+	+	+	+	0	0	+	+
Helen	24	0	0	0	0	0	0	0	0	0	+	0	0	0	/	/	/	0	+	+	+	+	+	+	+	+	+	+
Ida	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	0	+	+	0	/	/	/	/
Joan	18	0	0	0	/	/	/	/	/	/	/	/	/	0	0	0	0	0	0	0	+	0	+	0	0	0	0	0
Mona	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	+	+	+	0	0	0	+	0
Nannie	27	0	0	0	0	0	0	0	0	+	0	0	0	0	0	0	0	0	0	0	0	+	+	0	0	+	0	
Olive	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	+	+	0	0	+	0	0	0	+	
No. positive ...		1	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	2	3	4	5	7	7	3	1	2	5	5
No. tested ...		7	7	7	6	6	6	6	7	7	8	8	9	10	9	9	9	10	10	10	9	9	9	9	8	8	8	8
Per cent. positive ...		14·3	0	0	0	0	0	0	0	14·3	12·5	25·0	0	0	0	0	0	20·0	30·0	40·0	55·5	77·7	77·7	33·3	12·5	25·0	62·5	62·5
No. of new positives ...		—	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	2	0	1	2	1	0	0	0	0	0	0
Cumulative No. positive		1	1	1	1	1	1	1	1	2	3	4	4	4	4	4	4	6	6	7	9	10	10	10	10	10	10	10
Cumulative per cent positive		10	10	10	10	10	10	10	10	20	30	40	40	40	40	40	40	60	60	70	90	100	100	100	100	100	100	100
Hands ...		0	0	0	0	0	0	0	0	0	0	+	0	+	+	+	+	+	+	+	+	+	0	0	0	0	+	+

/ = Not sampled. 0 = Negative. + = Teat or enriched milk positive or both.

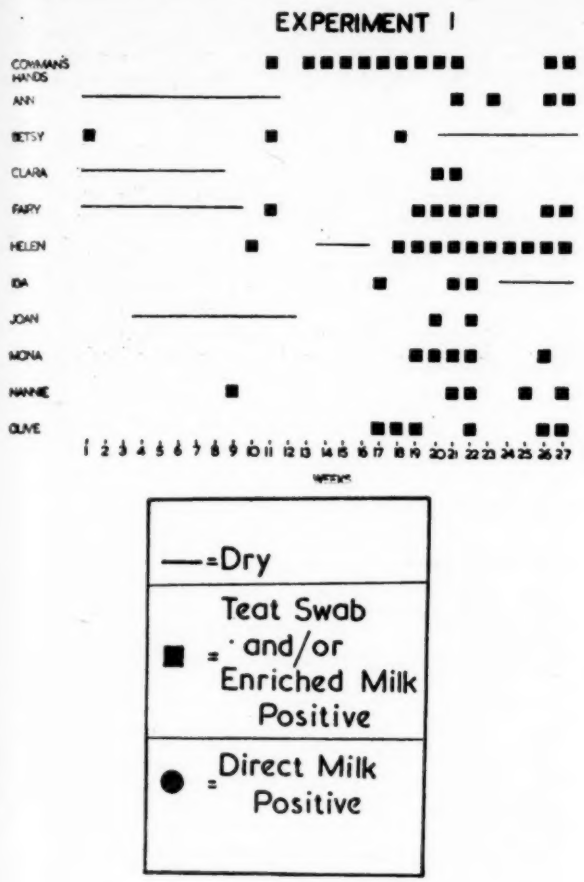

FIG. 3.

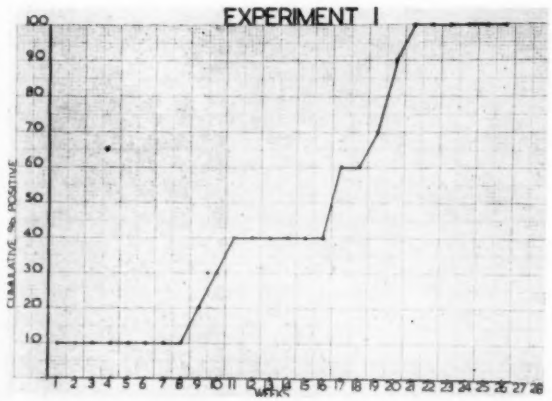

FIG. 4.—Milking technique. Separate udder cloths for each cow without disinfection. Strict teat cup disinfection.

EXPERIMENT 2

This experiment was based on the following milking technique: one separate sterile udder cloth per cow, hot udder washing water containing hypochlorite, double sets of teat cups strictly disinfected and no hand stripping. Results are shown in Table II and Figs. 5 and 6.

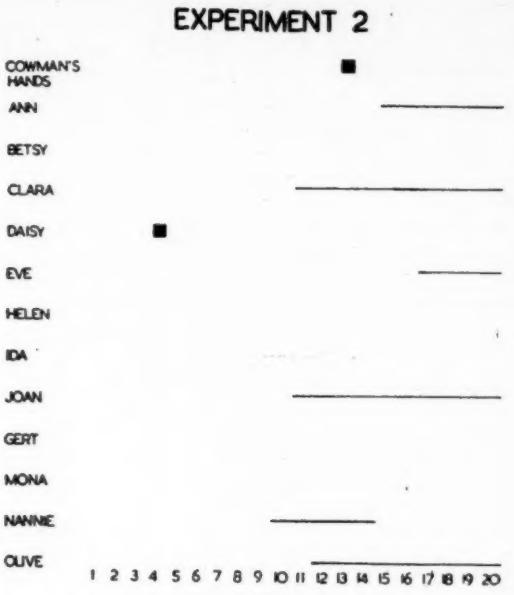

FIG. 5.

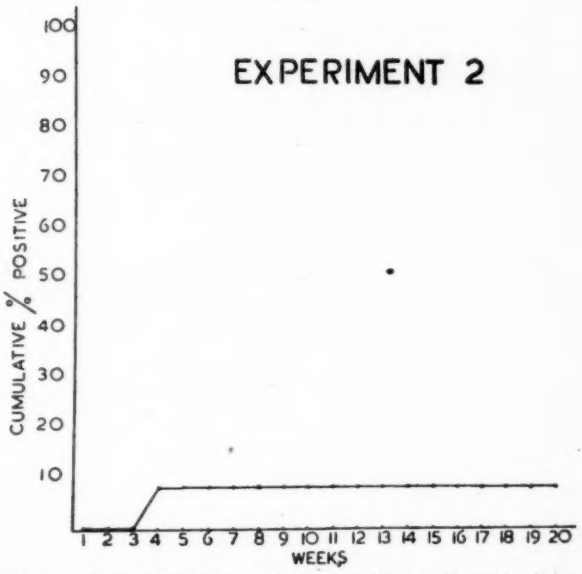

FIG. 6.—Milking technique. Separate udder cloths with disinfectant. Strict teat cup disinfection.

Apart from a teat positive cow, Daisy, in the fourth week, and positive milker's hands in the 13th week, there was no evidence of spread of *Str. agalactiae* infection. At the 20th week, when the experiment was stopped, the cumulative percentage positive rate was still only 8·3 due to the one cow, Daisy.

It was considered that the technique as detailed above was controlling the spread of *Str. agalactiae* from the "donor" cow to the rest of the herd.

The next step in these observations was to try to define what particular details of milking technique were likely to be conducive to spread of *Str. agalactiae*.

TABLE II
EXPERIMENT 2
(One separate sterile udder cloth per cow plus disinfectant in udder washing water. Double sets of teat cups and strict disinfection)

Cow	No. of tests out of 20	Weekly tests																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ann ...	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/	/	/	/	/
Betsy ...	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clara ...	10	0	0	0	0	0	0	0	0	0	0	/	/	/	/	/	/	/	/	/	/
Daisy ...	20	0	0	0	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eve ...	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/	/	/
Helen ...	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ida ...	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Joan ...	10	0	0	0	0	0	0	0	0	0	0	/	/	/	/	/	/	/	/	/	/
Gert ...	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mona ...	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nannie ...	15	0	0	0	0	0	0	0	0	0	/	/	/	/	/	0	0	0	0	0	0
Olive ...	11	0	0	0	0	0	0	0	0	0	0	0	/	/	/	/	/	/	/	/	/
No. positive		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. tested		12	12	12	12	12	12	12	12	12	11	9	8	8	8	8	8	7	7	7	7
Per cent. positive ...		0·0	0·0	0·0	8·3	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0
No. of new positives...	—	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative No. positive	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cumulative per cent. positive	0	0	0	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3	8·3
Hands	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	0	0	0	0	0	0

/ = Not sampled. 0 = Negative. + = Teat or enriched milk positive or both.

EXPERIMENT 3

In this experiment the milking technique was as follows : one separate sterile udder cloth for each cow with hot udder washing water containing hypochlorite. There were no double sets of teat cups for each milking machine bucket unit, and the teat cups were not disinfected between each cow. The teat cups which had milked the "donor" cow were used immediately for milking other cows in the herd. The order in which this set was used was changed daily so that all cows in the herd were equally exposed to infection. There was no hand stripping. Table III and Figs. 7 and 8 contain the details of the experiment.

TABLE III
EXPERIMENT 3
(One separate sterile udder cloth per cow plus disinfectant in udder washing water. No disinfection of teat cups)

Cow	No. of tests out 25	Weekly tests																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Ann	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	0	0	0	0	0	0	0
Clara	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/	/	/	/	/	/	/	/
Daisy	16	/	/	/	/	/	/	/	/	0	0	0	0	0	0	0	+	0	0	0	0	0	0	0	0	0
Eve	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	—	0	0	0
Fairy	16	0	0	0	0	0	0	0	0	0	0	0	0	0	×	×	×	/	/	/	/	/	/	/	/	/
Helen	19	/	/	/	/	/	0	0	0	0	0	0	0	0	0	0	—	0	0	0	0	0	0	0	0	/
Ida	21	/	/	/	/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Joan	25	0	0	0	0	0	0	0	0	0	0	0	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Nannie	16	0	0	0	0	0	0	0	0	0	0	/	/	/	/	/	/	/	/	0	0	0	0	0	0	0
Olive	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/	/
No. positive ...		0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	5	1	1	1	1	1	2	1	1	1
No. tested ...		7	7	7	7	8	9	9	9	9	10	10	9	9	9	9	9	7	7	7	7	8	8	7	7	6
Per cent. positive		0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	11·1	11·1	22·1	22·1	55·5	14·3	14·3	14·3	14·3	12·5	25·0	14·3	14·3	16·6
No. new positives	—	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	0	0	0	0	0	1	0	0	0
Cumulative No. positive ...	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	5	5	5	5	5	5	6	6	6	6
Cumulative per cent. positive	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	10	10	20	20	50	50	50	50	50	50	60	60	60	60
Hands ...	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

/ = Not sampled. 0 = Negative. + = Teat or enriched milk positive or both. × = Direct milk positive.

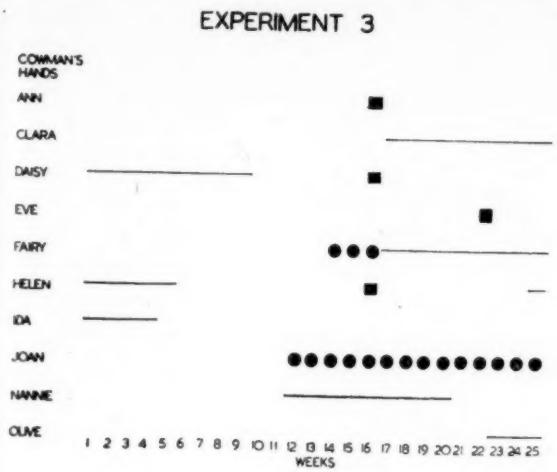

FIG. 7.

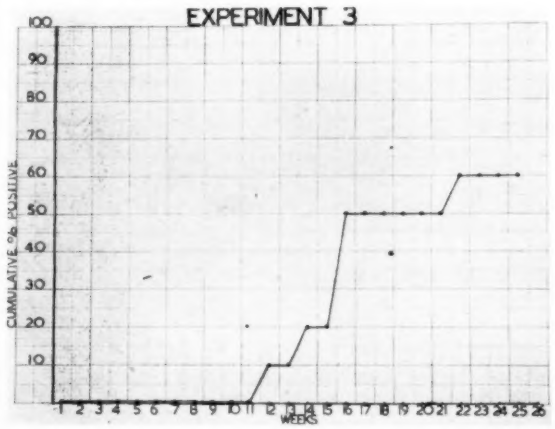

FIG. 8.—Milking technique. Separate udder cloths with disinfectant. No teat cup disinfection.

For the first 11 weeks there was no recovery of *Str. agalactiae* from any cow except the donor animal. At the 12th week Joan had contracted an established infection of the interior of the udder, as shown by direct milk positives, which persisted until the end of the experiment. (This cow, Joan, acted as the donor in subsequent experiments.) At the 14th week another cow, Fairy, also became infected in the udder for the remaining three weeks of her lactation. On the 16th test three more cows were enriched milk or teat positive. There were no further infections until the 22nd week, when one more cow was positive. In terms of cumulative percentage positive there was no spread for the first 11 weeks. Between the 11th and 16th week there was a more rapid spread to 50 per cent. and thereafter only a slow rise to 60 per cent. by the 22nd week. This level had not changed by the 26th week, when the experiment closed.

The relatively slow spread of infection in the herd was unexpected in view of the opportunities for the spread of *Str. agalactiae* due to the direct transference of infected teat cups from cow to cow.

EXPERIMENT 4

The milking technique was changed to one udder cloth for the whole herd, which was dipped into a bucket of warm water which contained no hypochlorite, after washing each cow. The double set of teat cups for each milking bucket unit was reinstituted, the alternate set not in use being disinfected as described for Experiment 1. There was no hand stripping. Results are shown in Table IV and Figs. 9 and 10.

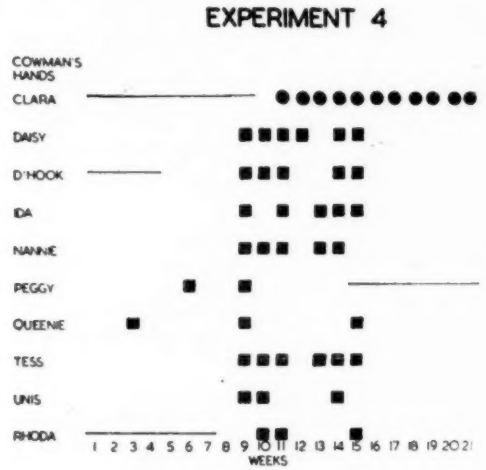

FIG. 9.

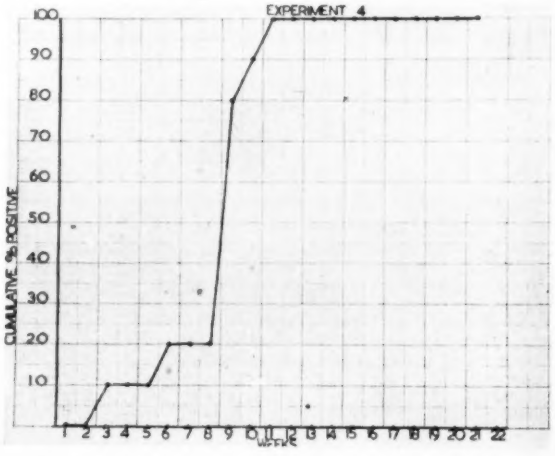

FIG. 10.—Milking technique. One udder cloth for the whole herd without disinfectant. Strict teat cup disinfection.

In the first seven weeks two cows became positive. At the ninth week six more cows were positive. At the next test Rhoda, a heifer who had been in the herd only a fortnight, yielded *Str. agalactiae*. Clara developed an established infection of her udder at the 11th week, one week after calving. In other words, by the 11th week the cumulative percentage positive rate had reached 100.

This rate of spread was to be expected under the conditions of the experiment.

TABLE IV

EXPERIMENT 4

(One udder cloth for the whole herd and no disinfectant in water. Double sets of teat cups and strict disinfection)

Cow	No. of tests out of 21	Weekly tests																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Clara	12	/	/	/	/	/	/	/	/	/	0	×	×	×	×	×	×	×	×	×	×	×
Daisy	21	0	0	0	0	0	0	0	0	+	+	+	+	0	+	+	0	0	0	0	0	0
D'Hook	17	/	/	/	/	0	0	0	0	+	+	+	0	0	+	+	0	0	0	0	0	0
Ida	21	0	0	0	0	0	0	0	0	+	0	+	0	+	+	+	0	0	0	0	0	0
Nannie	21	0	0	0	0	0	0	0	0	+	+	+	0	+	+	0	0	0	0	0	0	0
Peggy	14	0	0	0	0	0	+	0	0	+	0	0	0	0	0	/	/	/	/	/	/	/
Queenie	21	0	0	+	0	0	0	0	0	+	0	0	0	0	0	+	0	0	0	0	0	0
Tess	21	0	0	0	0	0	0	0	0	+	+	+	0	+	+	+	0	0	0	0	0	0
Unis	20	/	0	0	0	0	0	0	0	+	+	0	0	0	+	0	0	0	0	0	0	0
Rhoda	14	/	/	/	/	/	/	/	0	0	+	+	0	0	0	+	0	0	0	0	0	0
No. positive ...		0	0	1	0	0	1	0	0	8	6	7	2	4	7	7	1	1	1	1	1	1
No. tested ...		6	7	7	7	8	8	8	9	9	10	10	10	10	10	9	9	9	9	9	9	9
Per cent. positive		0·0	0·0	14·3	0·0	0·0	12·5	0·0	0·0	88·8	60·0	70·0	20·0	40·0	70·0	77·7	11·1	11·1	11·1	11·1	11·1	11·1
No. new positives		—	0	1	0	0	1	0	0	6	1	1	0	0	0	0	0	0	0	0	0	0
Cumulative No. positive ...		0	0	1	1	1	2	2	2	8	9	10	10	10	10	10	10	10	10	10	10	10
Cumulative per cent. positive ...		0·0	0·0	10	10	10	20	20	20	80	90	100	100	100	100	100	100	100	100	100	100	100
Hands		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

/ = Not sampled. 0 = Negative. + = Teat or enriched milk positive or both. × = Direct milk positive.

EXPERIMENT 5

Bearing in mind the slow rate of spread that occurred in Experiment 3, with no teat cup disinfection, it was decided to repeat the same set of milking conditions. These were separate sterile udder cloths and disinfectant in the udder washing water, but there were no alternate sets of milking machine teat cups and no disinfection of those in use between each cow. There was no hand stripping. Results are in Table V and Figs. 11 and 12.

TABLE V

EXPERIMENT 5

(One separate sterile udder cloth for each cow plus disinfection in udder washing water. No disinfection of teat cups)

Cow	No. of tests out of 20	Weekly tests																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ann ...	19	/	0	0	0	0	0	0	0	0	×	×	×	×	0	0	0	0	0	0	0
D'Hook ...	20	0	0	0	0	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ida	14	0	0	0	/	/	/	/	/	/	0	0	0	0	0	0	0	0	0	0	0
Nannie ...	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/	/	/	/	/
Olive ...	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queenie ...	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/	0	0
Rhoda ...	15	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/	/	/	/
Tess ...	15	0	0	0	0	0	0	+	0	0	0	0	0	0	0	0	0	/	/	/	/	/
Unis ...	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veda ...	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No. positive		1	0	0	0	1	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0
No. tested		9	10	10	9	9	9	9	9	9	10	10	10	10	10	9	7	6	6	7	7	7
Per cent. positive ...		11·1	0·0	0·0	0·0	11·1	0·0	11·1	0·0	0·0	10·0	10·0	10·0	10·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0
No. new positives ...		—	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Cumulative No. positive		1	1	1	1	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4
Cumulative per cent. positive		10	10	10	10	20	20	30	30	30	40	40	40	40	40	40	40	40	40	40	40	40
Hands		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

/ = Not sampled. 0 = Negative. + = Teat or enriched milk positive or both. × = Direct milk positive.

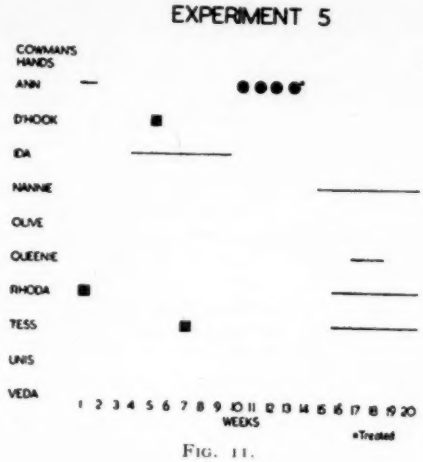

FIG. 11.

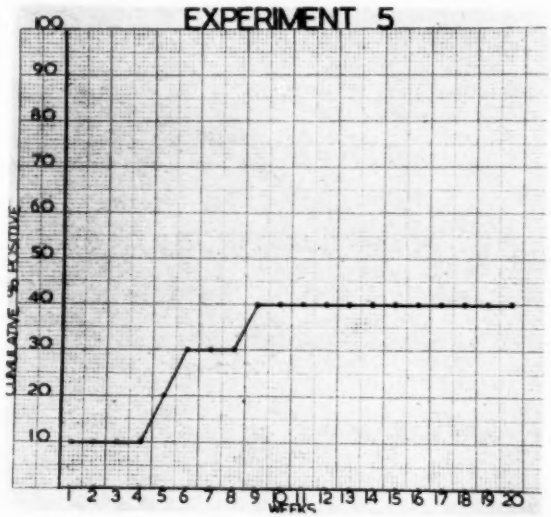

FIG. 12.—Milking technique. Separate udder cloths with disinfectant. No teat cup disinfection.

In the first nine weeks *Str. agalactiae* was recovered from three cows only. At the 10th test Ann developed an established infection of her udder. This infection was allowed to continue for four weeks ; it was then treated and cured with penicillin. (The reasons for treating this cow were extraneous to the experiment, but the donor cow was still present.) The maximum cumulative percentage positive rate, which reached 40 at the 10th week, remained at this level until the close of the experiment at the 20th week.

It will be seen that the extent of spread was even less than it was in Experiment 3, although it occurred a little earlier.

Discussion

Although it is realised that many factors—such as anatomy of the udder and teats, age, make of milking machine—may play important parts in the production of contagious mastitis, these studies have proceeded on the well-justified assumption that *Str. agalactiae* plays a primary and cardinal rôle in its aetiology. In studies of methods of transmission the early detection of the presence of this organism becomes of considerable importance, and it is for this reason that enrichment methods of bacteriological culture have been part of the examinations. Mattick, Shattock & Jacob (1941) have shown that similar enrichment methods will detect numbers of light infections which would have been undetected by direct methods. Of course, the use of such methods may be misleading if only true infections of the interior of the udder are of interest, as carelessness in milk sampling may result in contamination of the sample with *Str. agalactiae* from the skin, resulting in some false positives.

In these experiments the presence or absence of *Str. agalactiae* in or on the udder was the main interest, and the extent of the infection was of less consequence.

The results presented in Imperial Bureau of Animal Health (*Review Series No. 2*) (1944) clearly indicate that under average conditions of herd management *Str. agalactiae* was constantly being passed from one cow to another, and that over a sufficient period of time the organisms could be recovered from the teat skin or the milk at one test or another in a large proportion of the herd. The results presented above in the Thurgarton herd, when expressed as graphs of cumulative percentage positive cows and considered over time, can be used as a measure of the rapidity of spread.

The voluminous advisory literature on the control of mastitis, particularly in the U.S.A., has laid great emphasis on the need for effective sanitary practices. Although much of this advice is based on sound hygienic common sense it is surprising how little of it, if any, is related to scientific evidence obtained from experiment. In fact, the evidence gathered by the Imperial Bureau of Animal Health (1944) was the first real information published which could be related to the advice on sanitation offered so freely in previous years. From my search of the literature it would seem that the results given in this present work are the first attempts to subject different sanitary milking practices to experimental analysis.

It is opportune at this point to discuss the probable reservoirs of *Str. agalactiae*, for it is fundamental that control measures must be based on an adequate knowledge of the distribution of the organisms in the cow's environment.

Ayers & Mudge (1923) failed to demonstrate *Str. agalactiae* in the bovine mouth or faeces. Francis (1941) examined 100 pairs of bovine tonsils and vaginal swabs from 40 cows ; *Str. agalactiae* was not isolated from any sample, but *Str. dysgalactiae*, *Str. uberis* and *C. pyogenes* were all recovered from tonsils, five, seven and 18 times respectively, and once each from the vagina.

However, Bull *et al.* (1940) recovered eight strains of *Str. agalactiae* from the faeces of seven cows. Chodkowski (1949) has reported the most extensive series of investigations of the distribution of *Str. agalactiae* outside the bovine udder. In a highly infected laboratory herd, numerous samplings were made from widely distributed patches of skin, teats, exteriors of udders, nostrils, mouths, recta and vaginae. *Str. agalactiae* was recovered from most of these sites, including the mouths (1 out of 19) and nostrils (1 out of 19), but not from the recta (30 samples) or vaginae (four samples). The organism was also recovered from a variety of objects in the cowshed. As far as objects in the cowshed and dairy are concerned, similar results have been recorded previously by the author and workers at Reading, Imperial Bureau of Animal Health (1944).

Most of this evidence points to the fact that the reservoir of *Str. agalactiae* is in or on the bovine udder. Even the various sites on the cows examined by Chodkowski (1949) and found positive by him were all liable to contamination from the udder, directly or indirectly. It is of interest that the only sites that were negative were recta and vaginae.

In the light of one's own observations and supporting evidence from the literature, this work at Thurgarton was based on the supposition that the reservoir of *Str. agalactiae* is in or on the bovine udder and that spread from one cow to another takes place through the medium of vehicles which pass from one udder to another. These vehicles are mainly limited to milking time, and are three in number—namely (1) the udder washing process ; (2) the milking machine teat cups ; and (3) milkers' hands.

The recovery of *Str. agalactiae* from objects in the dairy and cowshed may be attributed in most cases to contamination by infected milkers' hands. However, it should be pointed out that milkers' hands will not only be contaminated by handling infected udders, as they are also liable to gross contamination in the process of washing-up infected dairy utensils. The evidence for this statement may be found in the description of Experiment 1. Although the infected udder and objects in frequent contact with it represent the most serious foci of *Str. agalactiae*, it must be remembered that this organism has been recovered on occasion from the air of cowsheds (Imperial Bureau of Animal Health, 1944; Chodkowski, 1949).

These experiments at Thurgarton were designed to test the effectiveness of a rigid milking technique based on separate sterile udder cloths, hypochlorite in the udder washing water, double sets of teat cups strictly disinfected between each cow and no hand stripping. When this technique was tested, it was effective in arresting spread of *Str. agalactiae* (Experiment 2). However, the same technique without the addition of hypochlorite in udder washing water was not capable of controlling the passage of this organism from cow to cow (Experiment 1).

When the standard technique arrived at in Experiment 2 was subjected to a critical breakdown in subsequent experiments it was found that the complete omission of teat cup disinfection (Experiments 3 and 5) rather surprisingly was not followed by rapid spread and the cumulative percentage positive level rose only slowly to 60 and 40 respectively in over 20 weeks' observations. The importance of a careful udder washing technique was again emphasised by the results in Experiment 4 when 100 per cent. cumulative positive was reached in 11 weeks with poor udder washing. From the results of these experiments, under the conditions described, it would appear that udder washing was the most important vehicle of transmission of *Str. agalactiae* in the Thurgarton herd. Nevertheless, it should not be inferred that teat cup spread is of no account, and in some herds it may be important. Unpublished work from these laboratories has shown that the destruction of *Str. agalactiae* on the surface of old worn teat cup rubbers is not easily accomplished.

Provided the amount of infection—*i.e.*, the number of infected cows—is not excessive, a rigid technique carefully followed as in Experiment 2 is capable of controlling spread of infection by *Str. agalactiae*. Certainly it would seem that the chance introduction of infection into a clean herd is not necessarily followed by rapid spread, even under conditions of poor management.

Finally, some consideration should be given to the method of establishing a clean herd. In our experience the foundation of a clean herd is most easily accomplished by a foundation stock of heifers which calve for the first time on the premises. However, the evidence that heifers are normally free from infection with *Str. agalactiae* is equivocal. Thus Mattick, Shattock & Jacob (1941) recovered this organism from 17 first calvers out of a total of 377 heifers (4·5 per cent.) over three years in a herd where they were tested in isolation within 10 to 20 days of calving. Bull *et al.* (1940) set up an experimental herd of heifers under conditions of apparent isolation, but *Str. agalactiae* was isolated from 16 quarters in the first week after calving, although the infections did not persist. Miller & Heishman (1944) recovered *Str. agalactiae* from one heifer out of 77 examined, an incidence of 1·3 per cent.

However, these articles do not make it clear that these infections were detected in the milk or colostrum of these animals on the first occasion they were milked or handled. For instance, the heifer Rhoda in Experiment 4 was positive within three weeks of her entry into the herd, but she had given two negative tests before she became infected. The only convincing evidence that heifers may calve with an established *Str. agalactiae* infection would be provided if these organisms could be demonstrated in the first milk samples in animals that had not been handled previously. It must also be remembered that the technique of sampling must be careful, as chance contamination from the environment may easily lead to false positives. As yet only Schalm (1942) has provided such evidence, based on four experimental calves, one of which freshened with a *Str. agalactiae* infection.

On the other hand, Hastings, Beach & Johnson (1943) were able to set up three groups of freshly calved heifers which were free of infection.

Summarising, it will be generally agreed that herds founded on first calvers are much less likely to be infected with *Str. agalactiae* than older cows.

Alternatively, the increasing range of suitable chemotherapeutic drugs and antibiotics offers the possibility of freeing the whole herd of infection by treatment. Edwards, Hughes & Taylor (1948) were the first workers to adopt a "blitz" procedure of treatment in which all the cows in a herd were treated simultaneously in an attempt to eradicate *Str. agalactiae*. The drug used was sulphanilamide by udder infusion. Complete eradication was not achieved, but the infection rate was reduced from 63 to 5 per cent. The retention of resistant cases in the herd, and the fact that these cases had persistent teat sores, probably explained the failure to achieve complete eradication. The importance of teat sores had been previously emphasised by Hughes & Edwards (1946) in their unsuccessful attempts to treat teat skin infections with *Str. agalactiae* and control its spread, by the regular application of the quarternary ammonium compound, cetyl trimethylammonium bromide (cetavlon) to the skin of the teats and the attendants' hands.

Stableforth *et al.* (1949) described extensive herd eradication programmes based on the simultaneous use of penicillin by intramammary infusion. The intramammary infusion of penicillin was accompanied by elaborate and vigorous disinfection of the cows and their environment, including treatment of the skin of the udder and milkers' hands with penicillin cream. *Str. agalactiae* was eradicated from five herds out of 10 by the first treatment. Hughes, Christie & Farmer (1950), in a comparative trial of procaine penicillin and calcium penicillin on a "blitz" basis, achieved the high rate of clearance of *Str. agalactiae* of approximately 90 per cent. bacteriological cures. Their intramammary therapy was coupled with treatment of the skin of the teats and milkers' hands with penicillin cream. The author is not convinced that the disinfection of the environment as advocated by Stableforth *et al.* (1949) is essential, but in view of the importance of persistent skin infection of teats, especially those with sores, and the contamination of milkers' hands, concomitant application of some effective bactericide to these sites would seem to be a necessary part of treatment.

In conclusion, it is possible to set up herds free from *Str. agalactiae* by the use of heifers as foundation animals, or alternatively by the clearance of infection in established herds by the newer methods of treatment used simultaneously on a herd basis. Such methods, followed by the adoption of a rigid milking routine described above, should be capable of keeping herds free from *Str. agalactiae* infection or controlling its spread should it be introduced by chance. These measures are more likely to be successful in self-contained herds.

The different distribution of the other pathogens associated with mastitis, their seasonal incidence and in some cases their predilection for the non-functioning udder make it clear that the approach to their control must lie along different lines, and it must await the gathering of further knowledge.

Summary

An account is given of experiments to assess the importance of different methods of milking management in facilitating the spread of *Str. agalactiae*. The observations were made in a herd in which it was possible to start each experimental period with only one infected cow as the source of infection. These experiments demonstrated that strict attention to udder washing, using separate sterile udder cloths with hypochlorite disinfectant in the udder washing water, the provision of double sets of teat cups and clusters for each milking machine bucket which were adequately disinfected between each cow by at least four minutes' contact with hypochlorite throughout the interior of the teat cluster system, and no hand stripping, were capable of controlling spread of *Str. agalactiae*.

When this basic procedure was subjected to critical experimental alterations to determine which particular vehicles were important in spreading *Str. agalactiae* it became clear that, in this herd at least, careless udder washing, particularly the omission of hypochlorite disinfectant in the udder washing water, was the most important factor in the spread of infection. Although failure to sterilise teat cups between cows resulted in transmission of *Str. agalactiae* from cow to cow the rate of spread was not as rapid as with a poor udder washing technique.

Acknowledgments.—I am indebted to the directors of Boots Pure Drug Co., Ltd., particularly to the late Sir Jack Drummond, F.R.S., for their support and consideration in allowing me to reserve the Checkers herd of dairy cows at Thurgarton exclusively to these studies for a period of four years.

I am especially grateful for technical help, at various times during these rather wearisome observations, to Misses K. Bastable, W. Crowley, M. Martin and J. Newell, and my thanks are due to Mr. L. Kelk for his continuous care of the herd and his willingness to follow the variety of milking methods imposed during the experiments.

References

Ayers, S. H., & Mudge, C. S. (1923.) *J. infect. Dis.* **33.** 155.
Berger, J., & Francis, J. (1951.) *Vet. Rec.* **63.** 283.
Bull, L. B., Murnane, D., Munch-Petersen, E., & MacLean, J. D. (1940.) *Bull. Counc. Sci. indust. Res. Aust. No. 134.*
Chodkowski, A. (1949.) *J. comp. Path.* **59.** 275.
Edwards, S. J., Hughes, D. L., & Taylor, J. I. (1948.) *Vet. Rec.* **60.** 45.
Francis, J. (1941.) *Vet. J.* **97.** 243.
Harrison, J. (1941.) *J. Dairy Res.* **12.** 18.
Hastings, E. G., Beach, B. A., & Johnson, K. (1943.) *J. Dairy Sci.* **26.** 471.
Hughes, D. L. (1948.) *Vet. Rec.* **60.** 659.
———. (1949.) XIIth Internat. Dairy Congress, Stockholm, Section 1, Subject 4, p. 537.

AN OUTBREAK OF *T. BRUCEI* INFECTION IN POLO PONIES WITH SPREAD APPARENTLY BY BITING FLIES OTHER THAN *GLOSSINA*

BY

JOHN D. TURTON, B.Sc. (EDIN.), M.R.C.V.S.,
Department of Animal Health, Accra, Gold Coast, W. Africa

The spread of trypanosomiasis caused by *T. vivax*, *T. congolense* or *T. brucei*, by flies other than *Glossina* has been postulated for many years. Evidence for this has almost always been circumstantial. In 1911, Jowett, in Portuguese East Africa, demonstrated that pathogenic trypanosomes could be transmitted by *Stomoxys* and *Haematopota*. It was thought for many years that no tsetse flies were present on Zanzibar Island and in 1923 Aders suggested that *Stomoxys* and *Lyperosia*, species of *Culex*, *Mansonia* and *Aedes* might also be incriminated. However, small numbers of *G. austeni* were reported later (Buxton, 1945). In 1936 Hoare gave evidence for the transmission of *T. simiae* by *Stomoxys* and members of the Tabanidae after the initial introduction by tsetse flies.

Trypanosomiasis in Mauritius, Panama and South America is caused by an organism identical with or similar to *T. vivax*. In South America it is known as *T. guyanense* or *T. viennei* but these names are regarded as synonyms of *T. vivax*. There are of course no tsetse flies in these countries.

The spread of nagana by biting flies other than *Glossina* has been suggested by Lichtenheld and Hornby in Northern Rhodesia and Tanganyika. Their views are supported by those of Montgomery and Kinghorn in Northern Rhodesia and by Jack in Southern Rhodesia. As far as *T. brucei* is concerned, Richardson in his book "Veterinary Protozoology" states that there is little evidence for the mechanical spread.

It is believed that transmission of trypanosomiasis by biting flies other than *Glossina* is purely mechanical. There has never been any evidence that the trypanosome undergoes a developmental cycle in these other flies.

In the outbreak in question the polo ponies, 17 in number, along with two thoroughbreds imported from the United Kingdom, were housed in the same stable in somewhat cramped conditions. The stable is built in the form of three sides of a square with the open side facing the sea. The outer wall is of stone and the rest of wood. Each individual stall is small and the stable boys live with their families in the vacant ones. The building is situated about 50 yards from the sea and a main road runs some 250 yards behind. The land in the immediate vicinity of the stable is grass covered, with an occasional tree to be seen. There is no cover for tsetse flies and none have been seen.

Hughes, D. L., & Edwards, S. J. (1946.) *J. Hyg.* **44.** 442.
———, Christie, G. J., & Farmer, R. K. (1950.) *Vet. Rec.* **62.** 11.
Imp. Bur. Anim. Health. (1944.) *Review Series No. 2.*
Jones, F. S., & Little, R. B. (1934.) quoted from *Bovine Mastitis*, Little, R. B., & Plastridge, W. M. (1936.) New York, p. 284.
Mattick, A. T. R., Shattock, P. M. F., & Jacob, M. M. (1941.) *J. Dairy Res.* **12.** 139.
Miller, W. T., & Heishman, J. O. (1944.) *Amer. J. vet. Res.* **5.** 55.
Nat. Vet. Med. Assoc. (1941.) Report on Diseases of Farm Livestock. *Section 1.*
Peterson, W. E. (1944.) *Cornell Vet.* **34.** 38.
Schalm, O. W. (1942.) *Ibid.* **32.** 49.
Stableforth, A. W., Hulse, E. C., Wilson, C. D., Chodkowski, A., & Stuart, P. (1949.) *Vet. Rec.* **61.** 351.
Wilson, C. D. (1952.) *Ibid.* **64.** 525.

The outbreak occurred in the middle of the rainy season when biting flies such as *Stomoxys*, *Hippobosca* and members of the Tabanidae are present in large numbers in the vicinity of animal habitations. In this case there was the additional attraction of human beings on the same premises.

The polo ground is close to the sea, and the ponies had moved only between the ground and their stable, with exercise on the beach. For many weeks previous to the outbreak no pony had been in an area where tsetse flies might be expected to occur. The two thoroughbreds had exercised mainly on the sandy beach with an occasional visit to the race-course in the centre of Accra.

Two weeks before the disease broke out, two ponies were moved to the stable from another on the outskirts of Accra. An outbreak of trypanosomiasis had occurred in this stable some years before. The bush in the vicinity of this stable affords cover for tsetse flies which are believed to enter the area along the lorry routes through fly-infested parts.

On July 9th one of the ponies was found to be lethargic and the gait slightly ataxic. On examination the mucous membranes were seen to be icteric to a small degree and there was lachrymation. Temperature and pulse rate were raised. Wet blood films showed the presence of trypanosomes moving rapidly but making little progress in moving out of the field. Stained films showed polymorphic, flagellate trypanosomes and the infection was considered to be of *T. brucei*.

The following day a further 15 horses were examined, nine of which showed clinical signs of trypanosomiasis, manifest by icteric membranes, lachrymation, lethargy and in some cases pyrexia. Two of the ponies had an ataxic gait. The febrile reaction in *T. brucei* in horses is generally characterised by frequent exacerbations and remissions. All nine cases were confirmed to be infected by blood examination of wet and stained films and in each case the trypanosome seen was morphologically indistinguishable from *T. brucei*. A lame pony at the stables was found to be negative for trypanosomes on blood examination. The two English thoroughbred race-horses kept at the stable were found to be negative. Both ponies which had been moved to the stable two weeks previously were infected, the only signs exhibited being slight fever, lachrymation and icterus.

All the infected horses were treated with antrycide methyl sulphate. A dose of 1·5 grammes in 10 ml. of sterile water was given subcutaneously in the neck.

On July 14th wet and stained films from all the ponies and horses were examined and found to be free of trypanosomes. A further dose of 1·5 grammes of antrycide methyl sulphate was given to those animals which had been infected at the first examination. Blood examinations were again carried out on the ponies on July 18th and on the thoroughbreds on the 23rd. All the slides were free of trypanosomes.

Wet and dry blood films from all the animals were examined on August 1st and proved negative.

Two of the horses continued to be affected with ataxia after the blood was freed of parasites and were given further treatment with antrycide, following which the gait became normal.

Slightly painful swellings occurred at the site of injection in all cases.

Five weeks after the discovery of the disease most of the ponies were playing polo, and appeared to have suffered no ill effects other than the reaction at the site of injection.

In view of the fact that two of the ponies were moved from an area previously known to have contained infected tsetse flies, into a stable situated in an area where it is highly improbable that tsetse can exist, it is suggested that the infection was carried from animal to animal by biting flies other than *Glossina* which at this time of year abound in the area.

Summary

(1) An outbreak of *T. brucei* infection in polo ponies is described.

(2) The question of transmission by biting flies other than *Glossina* is discussed.

Acknowledgment.—The author is grateful to the Director of Veterinary Services, Mr. S. Simpson, M.R.C.V.S., for permission to publish this article.

ANTHRAX

In an annotation *The Lancet* (December 20th; No. XXV of Vol. II, 1952) says: "The increase in anthrax among farm animals during the past few months was recently the subject of a question in the House of Commons,[1] and the danger of increased risk to man must of course be considered, even if this is not great. There are always a few cases of anthrax among animals in this country; and with the increase in imports of feeding-stuffs, notably bone-meal, it was likely that the incidence should rise. It has, in fact, been rising steadily for some months; in June, 31 new outbreaks were reported among animals, in July 90, in August 123, in September 170, in October 185, and in November a further 209; in all there have been 1,051 outbreaks among animals in Great Britain since the beginning of this year. There is no reason to suppose at present that this has meant any increase in the incidence among humans.

"Human anthrax is uncommon in Great Britain, though there is always a slight incidence among workers in the bone and hide trades; and dockers, knackers and agricultural workers may all come into contact with infection at times. The Chief Inspector of Factories, in his report for 1950,[2] mentions that there were 36 cases in that year (with no deaths), as against 21 in 1949. Laboratory workers and students handling stained films of anthrax need to be reminded from time to time that staining does not kill the spores of this organism, and that there is risk in handling such slides. This warning should be given specially to technicians in commercial laboratories who are interested in imported foodstuffs, and making a special study just now of anthrax. These workers may be handling anthrax cultures for the first time, and may not be fully familiar with the precautions necessary for safety. Contamination with live anthrax from stained slides is a risk which must be taken seriously, and those handling cultures should be scrupulous in avoiding contamination of their cuffs, or any other part of their clothing, and in leaving their white coats behind them in the laboratory when they go to meals. The hazards of a bacteriologist's life are sufficient, without adding to them unnecessarily.[3]

"The present increased infection among animals certainly derives from feeding-stuffs; but the bones of a single infected animal may contaminate a large quantity of material, and bacteriologists can only report on samples: if these happen to be negative it does not necessarily mean that the main bulk is free from anthrax spores. A negative result thus gives no grounds for a feeling of security. Doctors consulted about macules or vesicles, especially on the hands or face, should have anthrax in mind *at present*, and enquire into the recent history."

[1] See *Lancet*, Dec. 6th, 1952, p. 1128.
[2] Report of the Chief Inspector of Factories for the Year 1950. H.M. Stationery Office; p. 140.
[3] See *Lancet*, Dec. 13th, 1952, p. 1165.

* * * * *

CONVENTION OF BRITISH ANIMAL PROTECTION SOCIETIES

"Angry Prayers" is the title chosen by the National Canine Defence League to introduce its report on the Convention of British Animal Protection Societies, held at Caxton Hall, Westminster, in April, 1952, this symposium being the first of its kind for over 20 years. The contributions range from a poem, "The Bells of Heaven," by Ralph Hodgson, from which the title is taken, through a wealth of themes embracing legislation, euthanasia and blood sports, to a description of an animal hospital by a member of our profession and a discussion of the Jewish method of slaughter. The whole gives a vivid impression of the thought of people who are deeply concerned with the promotion of an ethical attitude towards the well-being of animals whose welfare is man's responsibility.

The President's New Year Message

Coronation year, the advent of which the nation welcomes this week, brings privilege to some, obligation and opportunity to all. Thus my high appreciation of the honour of leadership is linked with a sense of responsibility for the attainment by the Association of a standard of achievement worthy of the time. That charge must be shared by the membership as a whole, pledged throughout the Divisions, at home and abroad, to uphold the President and Council by devoted service.

To-day the world is learning the truth of the lesson unwearyingly taught by our distinguished hon. member Lord Boyd-Orr, that hunger is war's greatest ally, making self-evident the major role of the veterinary profession in reducing losses of food-producing animals by the prevention of disease and in the pursuit of a positive policy of promoting human and animal health through improved nutrition. Participation in this and other great enterprises brings upon the Association many urgent and pressing problems. Let us not forget, nevertheless, that stern as the tasks ahead of us may be, 1953 is to be marked, throughout the land, not only by dedication to duty, but by rejoicing.

It is in this spirit that my wife and I send to all whom these words may reach our sincere wishes for happiness and prosperity in this momentous New Year.

A. M. Graham.

ABSTRACTS

Hyaluronidase in Large-animal Therapy*

Hyaluronidase is described as an enzyme found in various situations, including testicular extracts, semen, snake venom and some haemolytic streptococci. It has the property of hydrolysing hyaluronic acid in the interstitial spaces of tissues, thus increasing the rate and extent of diffusion of injected solutions. It is non-toxic.

Practical experiments on its various therapeutic applications are described :—

Mastitis.—Hyaluronidase was added to various routine udder infusions. No untoward effects were noted but no improvement in their action could be detected.

Hypodermoclysis.—Hyaluronidase increases the rate of diffusion of large volumes of injected solutions such as saline, glucose or calcium and reduces the local reaction. It is emphasised that absorption into the blood stream is not necessarily faster and graphs are given to show that this is definitely not so with calcium. It is warned that this action does not reduce the danger of injecting strongly hypertonic or irritating solutions.

Local and Nerve Block Anaesthesia.—It is claimed that in the human hyaluronidase added to procaine solutions improves local and nerve block anaesthesia but the author's experiments showed little difference in animals when used in local anaesthesia or cornual or paravertebral block.

In the discussion the author gives his opinion that in practice probably the only real uses for hyaluronidase are in the rapid diffusion of large volumes of subcutaneous injections where 150 T.R. units per 500 c.c. may be used, and in nerve block where the nerves are deeply situated or otherwise difficult to locate exactly, and here 150 to 300 units per 100 c.c. anaesthetic solution may be used.

J. A. L.

* **An Evaluation of Hyaluronidase in Large-animal Therapy.** Roberts, S. J. (1951.) *Cornell Vet.* **41.** 321–331.

* * * * *

Hexachlorcyclohexane in Treatment of Lice in Swine*

The dosage of technical hexachlorcyclohexane (BHC) was 30 mg. per kg. bodyweight, given mixed with the food as a single dose. The preparation used contained 10 per cent. of the gamma-isomer. As soon as 12 hours after the feeding there were no lice on the pigs, which were previously heavily infested, and they were still free from lice 40 days later. The only symptoms shown by treated pigs were slightly increased thirst and more time was spent resting. The daily increase in weight was 10 per cent. higher after treatment. This method proved to be more economical in time and money than external application of the powder. In addition, the author considers his method to be safer, since there is less risk of absorption or ingestion of toxic amounts of BHC.

R. M.

* **Oral Administration of Hexachlorcyclohexane in the Treatment of Lice in Swine.** [Trans. title.] Wasserburger, H. J. (1952.) *Mh. VetMed.* **7.** 255–258.

REVIEW

[Fundamentals of the Histology of Domestic Animals. By R. E. Habel and E. L. Biberstein. (1952.) London : Baillière, Tindall & Cox. Menasha, Wisconsin : George Banta Publishing Company. Price 67s. 6d.]

The work of the teacher, as of the student, of a particular subject is greatly eased if a good text-book is available, but, by some mischance, there has in the past been published no text-book in English specifically concerned with the histology of the domestic mammals. However good the text-books of human histology may be, they must fail to meet the need for good descriptions of, for example, hoof, claws, feathers, ruminant stomachs, the various types of placenta, and so on. However, as a good text-book—Ellenberger's—had for long been published in Germany, two alternative solutions of the problem of providing a text-book in English were possible : that a good translation of this work should be prepared, or that a completely new work should be written. Fortunately, in the field of science, however the case may be in the field of literature, a translation can be just as good as the original, and two American teachers have now placed the English-reading veterinary student in their debt by preparing this authorised translation of the text-book that developed out of Ellenberger's—Trautmann and Fiebiger's *Lehrbuch der Histologie und vergleichenden mikroskopischen Anatomie der Haustiere*. The danger that translated texts will show in an exaggerated form that necessary failing of all text-books in developing subjects—that parts of the work will inevitably be out of date by the time of publication—has been minimised by the authors' revision of the original work, and they have added or removed material where they thought it desirable ; they have also provided some references and a useful bibliography.

While prolonged use in the class-room will be the true test of this book's value, the reviewer's first impressions are very favourable. The student's interest in his subject cannot fail to be increased as he finds examples drawn from the various domestic animals, including birds, instead of, perhaps, from the " executed man " of human histology. The illustrations number well over 400 ; they are mostly drawings, some of them in colour, and are very clear. The text runs fluently, and the degree of detailed information is never oppressive. Part I of the book deals in just under 100 pages with general histology of cells and tissues, while the second part, of some 300 pages, deals with the microscopic anatomy of the various organs and systems. This second part is particularly valuable and has some excellent low-power drawings.

The book should be of value to the graduate as well as to the student in studying histological and pathological sections ; indeed, it may be that it will prove of most help to the student when he already has some knowledge of histology, and also later on when studying pathological sections from the various species.

The authors and publishers of this English translation are to be congratulated on the result of their endeavours, which should have an important effect on the teaching and learning of veterinary histology in many parts of the world.

Weekly Wisdom

To do the right thing is generally the right thing to do.—Lord Grey, of Fallodon.

REPORT

R.S.P.C.A., CAIRO—EGYPT : ANNUAL REPORT FOR THE YEAR 1951

The Committee is gratified to place on record considerable achievement in all branches of the Society's work during the year 1951.

The total number of animals admitted to the Infirmary was 5,282 against 4,385 the previous year—an increase of 897, due to Police and R.S.P.C.A. Inspectors' energy. Moreover, cab owners have also been taking their sick animals to the Free Clinic with greater spontaneity and frequency while the public have displayed an increased tendency to report cases of cruelty and accidents on the streets and especially against pet animals in the houses. During the year under review 612 cases of cruelty were investigated and dealt with by the Society's Inspectors.

The daily average of animals under treatment at the Infirmary during the year was 235. This figure shows what an important share the Society plays in the welfare of animals in Cairo City. In fact, the Society does not confine itself to the medical treatment of large numbers of animals annually but concentrates on the prevention of cruelty to an ever-increasing extent. Propaganda was pursued particularly among cab owners, and weekly advice and instructions for more kindly treatment was a feature of the Society's normal activity.

Special attention was paid to saddles, the majority of animals stopped and admitted to the Infirmary being affected with sores due to ill-fitting saddles or harness. A special saddler was engaged to examine and repair these saddles. Owners were asked to bring saddles or harness to the Infirmary, with a view to inspection.

Outside Clinic

Following wide propaganda, animal owners are availing themselves increasingly of the Free Clinic of the Infirmary. The owners have come to appreciate the advantage of sending their sick animals to the Society's free clinic for advice or treatment rather than leaving them neglected until stopped by the police.

The following return shows the number of animals brought to the outside clinic during the year 1951 :—

Horses, mules and donkeys (for lameness, accidents, colic, wounds, etc.), 428 animals against 395 in the previous year.

Dogs and cats (for accidents, fractures, internal and skin diseases, etc.), 248 animals against 250 in the previous year.

Cruelty and Overloading

Every endeavour is being made to put a stop to this widespread form of cruelty by all possible means. Their Inspectors have drawn up quite a number of contraventions against drivers. The Committee have approached the President of the Royal Federation of Animal Welfare Societies in Egypt suggesting the drafting of legislation prohibiting the use of horses in the unpardonably cruel hard work of mixing clay at brick factories. This draft, after revision, was passed to the authorities concerned to be put into legal form.

Ambulances

The Society has now five ambulances transporting, day and night, animals having met with accidents in different parts of Cairo City; this apart from the transport of privately owned animals. During 1951, 1,305 animals were carried. Further-

more, since last year these cars operate daily, collecting all arrested animals from the different police stations. Formerly, all animals arrested came to the Infirmary on foot, frequently from far-distant areas.

This new venture constitutes, no doubt, an expensive item in the Society's budget but it is felt that the paramount desire of the Society to alleviate needless cruelty is thus accomplished admirably. This scheme has entailed a total expenditure of about £E.400 per annum.

All Sacred Writings and Sayings of the Prophet lay particular stress on kindness to dumb animals. The more ignorant among town and country folk would appear to harbour feelings and indulge in acts of maltreatment, in contradiction to the clear precepts of the Elders, persisting in the ill-treatment of animals, as birds, beasts of burden, or dogs and cats, a particularly widespread superstition being that of the Believer who displays a pronounced dislike, to say the least, for any dog approaching at the moment of prayer.

The Imams of Islam, contrary to popular belief, have come out—as recently as in 1940—on the side of the animal lover. An official Azhar ruling on the legality—from the religious standpoint—of breeding dogs, or of coming in contact with dogs, makes interesting reading :

(1) " It is the Imam Malek's belief that dogs may be kept in dwelling-places to protect inhabitants to drive away the intruder.

(2) " The body, saliva, mucus and sweat of dogs are clean as long as the animal is alive, and accordingly if dogs sit on beds or touch anybody, they do not make him unclean and will not interfere with the acceptability of his praying or when going round the sacred mosque whether his body is wet or not.

(3) " Therefore, should a dog lick or touch the clothes of the pray-er, the Believer is not defiled and his prayers are acceptable."

Finance

The financial situation of the Society during 1951 was not as satisfactory as it might have been. Income totalled £E.12,213 against expenditure, £E.13,058, an excess of £E.845 in expenditure over receipts.

The usual Government grant was not forthcoming in full owing to a ministerial decision changing the date of the financial year.

H. K.

RABIES IN CANADIAN WILD LIFE

The Calgary Correspondent of *The Times* reports that a serious outbreak of rabies is affecting wild life—particularly wolves and foxes—in northern Alberta, and has been confirmed in districts only 175 miles north of Edmonton. It has also spread eastwards into northern Saskatchewan, and appears to be moving northwards into the Lesser Slave Lake region and along the bank of the Athabasca river. The Alberta Government has instituted a large-scale campaign to poison hundreds of foxes and wolves within an area of about 400 square miles. The Federal Government has sent a veterinary officer into northern Saskatchewan to launch a vaccination programme which is expected to be completed in January.

" Several unpleasant possibilities have been aroused by the epidemic. Infected wolves become irrational, and lose their natural fear of human beings. If they attack cattle and pigs these become affected, and the disease is also highly infectious to humans. A further danger is that sled dogs, indispensable to fur trappers in this region, will also be affected by the outbreak, and thus seriously damage the economy of both northern Alberta and northern Saskatchewan.

" Rabies was first detected last June near the border between Alberta and the North-West Territories. It was thought at the time that early precautions had confined it to a small area, but it spread rapidly southwards. It is now hoped that the thinning out of wolves and foxes by poisoning will lower the rate of spreading of the disease. All sled dogs are being vaccinated."

QUESTIONS IN PARLIAMENT

Foot-and-Mouth Disease

Prior to the adjournment of the House of Commons, for the Christmas recess, on December 19th, the following questions were asked and replies made:—

Mr. Bossom asked the Minister of Agriculture what action he proposes to take to prevent the risk of foot-and-mouth disease infection from motor vehicles coming to this country from the Continent which may have picked up mud or manure on the roads in an infected country.

Sir T. Dugdale: This matter is being considered by the Gowers Committee and I shall, no doubt, receive their advice in due course. In the meantime, I do not propose to take further action for the reasons given in reply to my hon. Friend the Member for Tonbridge (Mr. G. Williams) on June 19th.

. . . . .

Anthrax

Mr. Bossom asked the Minister of Agriculture, since anthrax has increased in this country over the years in direct proportion to the amount of imports of feeding-stuffs and bones, if he will require that these are all properly sterilised before being admitted to this country.

Sir T. Dugdale: It would not be practicable to require all such substances to be sterilised before importation, but my Department is considering what further steps can be taken to prevent infected material getting into feeding-stuffs.

. . . . .

Animal Feeding (Antibiotics)

Mr. Nabarro asked the Minister of Agriculture whether he will introduce legislation to permit the use of antibiotics for fattening pigs.

Sir T. Dugdale: If the trend of results of the current trials is confirmed by a favourable recommendation from the Agricultural Research Council at the end of the year, the Government intend to introduce legislation when opportunity offers to permit the use of antibiotics in animal feeding under suitable safeguards and the necessary Bill is in preparation.

ROYAL COLLEGE OF VETERINARY SURGEONS

DECEMBER, 1952, MEMBERSHIP EXAMINATIONS

(*Continued from page 869*)

Dublin

Second Examination

Physiology only

Brownell, T. A.
Conroy, P. J.
Cox, Edward
Crowley, J. P.
Eastwood, P. J.
English, R. G.
Evans, J. A.
Fleury, A. T. J.
Gahan, M. A.
Harris, Miss M. D.
Harris, R. E.
McInerney, J. F.
O'Brien, J. D. P.
O'Neill, W. J.
Poole, J. B.
Sheridan, J. J.
Smith, K. J.
Smyth, L. J. F.
Stuart, N. C.
Wilson, D. J.

Anatomy only

Clarke, J. P.
Devereux, W. R.
Kent, D. K.
Kilroy, C. S.
Nunn, W. R.
O'Connor, S. P.
Stack, P. D. J.
York, A. J.

Third Examination

Hygiene only

Barry, K. T.
Daly, Edward
Deboys, D. C.
Gordon, James
Liffey, P. K.
McElroy, Robert
McManus, Dermot
Magee, B. F.
Tuite, Michael
White, J. J.

Pathology only

Cullen, R. G.
Kelly, E. J.
Kelly, Jeremiah
McGrath, M. J.
Mooney, F. M.
O'Dowd, P. W.
Quirke, J. M.
Smyth, P. W. W.
Taaffe, G. F.
Toolan, G. A.
Tubridy, T. J.
Walsh, P. D.
Wright, M. L.

Fifth Examination (Old Syllabus)

Beirne, J. P.
Pentland, W. H.

FINAL EXAMINATION (Revised Syllabus)

Darcy, Thomas	McGirr, P. J.
Harte, J. E.	McLoone, A. G.
Keane, J. J.	Murphy, O. J. N.
Lucey, Denis	O'Loughlin, M. J.
Lyons, T. M.	Phelan, J. J.
McCarthy, Patrick	Scott, W. A.

NOTES AND NEWS

Diary of Events

Jan. 7th.—Meetings of the Editorial Committee, B.V.A., at 36, Gordon Square: Executive 2 p.m.; main 3 p.m. (*N.B. Brought forward from the second to the first Wednesday in the month.*)

Jan. 7th.—Meeting of the R.A.V.C. Division, B.V.A., in the Lecture Theatre of the Zoological Society's Gardens, Regent's Park, London, 12 noon.

Jan. 9th, 1953.—Dumfries and Galloway Division, B.V.A., Ladies' Guild: Annual Dance in aid of the V.V.B.F., at Dumfries (Cairndale Hotel). (See Notice.)

Jan. 21st.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at 1, Wimpole Street, W.1, 5 p.m.

Jan. 30th.—Meeting of the Lincolnshire and District Division, B.V.A., at Lincoln (Saracen's Head Hotel), 2.15 p.m.

Feb. 12th.—Royal (Dick) School of Veterinary Studies Annual Ball, at the Assembly Rooms, George Street, Edinburgh.

Feb. 27th.—Annual Ball of the Veterinary Society, Faculty of Veterinary Science, The University, Liverpool, to be held in the Students' Union from 8.0 p.m. to 2.0 a.m.

Council and Committee Meetings of the B.V.A.

The following arrangements for the Council and Committee meetings of the B.V.A. in January, April and July of 1953, have been made by Council B.V.A.:—

January 14th, 15th and 16th in London.
April 29th, 30th and May 1st in Edinburgh.
July 29th, 30th and 31st in London.

The times of the various meetings will be published in due course.

The next quarterly meetings will be held in London on January 14th, 15th and 16th, 1953, in the following order:—

Wednesday, January 14th.—10 a.m., Home Appointments Committee; 11.30, Parliamentary and Public Relations Committee; 2 p.m., Organising Committee; 4 p.m. Provisional Committee.

Thursday, January 15th.—10 a.m., Veterinary State Medicine Committee; 12 noon, Finance Sub-committee; 2.30 p.m., General Purposes and Finance Committee.

Friday, January 16th, at the Connaught Rooms:

9.30 a.m.—Special Meeting of Council to deal with: (1) New premises for the Association; (2) Report of the Departmental Committee on Licences under Section 7 of the Veterinary Surgeon's Act, 1948.

11 a.m.—Ordinary Meeting of Council.

R.C.V.S. Council and Committee Meetings

The next series of meetings will be held in London on February 4th, 5th and 6th (Council).

* * * * *

Anthrax Vaccine

Experience of the present arrangements under which anthrax vaccine has been supplied on the recommendation of the Ministry's Divisional Veterinary Officers in certain special areas has demonstrated that the vaccine is harmless, and affords satisfactory protection to the animals vaccinated. In view of this the Ministry has decided to make the vaccine available at a small charge to veterinary surgeons who may feel that its use would be justified in certain cases. The Ministry considers, however, that the number of animals affected by anthrax is not on a scale that would justify a widespread campaign of vaccination.

The price of the vaccine, which may be obtained from the Ministry's Veterinary Laboratory, New Haw, Weybridge, Surrey, will be 6d. per c.c. (one dose for cattle or two for pigs). The minimum quantity that can be supplied is 5 c.c. The arrangements for supplying the vaccine free of charge through Divisional Veterinary Officers in certain areas will be discontinued.

PERSONAL

Mr. W. Lyle Stewart's Appointment with FAO.—Mr. W. Lyle Stewart, M.R.C.V.S., Veterinary Investigation Officer at Elswick, Newcastle-on-Tyne, has been loaned by the Ministry of Agriculture to the Food and Agriculture Organisation of the United Nations for an assignment in Iceland, where he expects to be for the next year.

. . . . . .

Birth.—AYLIFFE.—On December 14th, 1952, to Olive, wife of A. R. Ayliffe, M.R.C.V.S., Cullompton, Devon, a daughter, Sarah Olive—sister for Anna Elizabeth.

. . . . . .

Forthcoming Marriages.—BISHOP—OSBORNE.—The engagement is announced between Captain Harry Wilkinson Bishop, R.A.V.C., younger son of Mr. and Mrs. H. H. Bishop, Buckmans, Malvern, and Miss Patricia Elizabeth Osborne, younger daughter of Mr. and Mrs. A. V. Osborne, Forest Gardens, Lyndhurst, Hants.

SLADDEN—MACLELLAN.—The engagement is announced of Ian Sladden, M.R.C.V.S., of Masham, Yorks, to Miss Maureen MacLellan, Maillaig, Inverness-shire.

. . . . . .

Marriage.—CAMERON—READING.—On December 24th, 1952, John Cameron, B.SC., M.R.C.V.S., D.V.S.M., of Kingston-on-Thames, to Nora Reading, Sutton Court, Chiswick.

. . . . . .

Will.—Mr. David Cameron Penman, veterinary surgeon, 13, Queen's Crescent, Glasgow, £9,624.

* * * * *

UNIVERSITY OF EDINBURGH: CONFERMENT OF DEGREES

The following degrees were conferred by the University of Edinburgh at a graduation ceremonial held on Friday, December 19th, 1952:

Doctor of Philosophy:—

E. C. Appleby, B.SC. (LOND.), M.R.C.V.S.; Thesis: "A Study of Mortality and Morbidity in the Population of a Zoological Park."

A. Marr, B.SC. (EDIN.), M.R.C.V.S.; Thesis: "Some Aetiological and Clinical Aspects of Bovine Parturient Paresis (Milk Fever)."

Bachelor of Science (Veterinary Science):—

D. G. Bennett, M.R.C.V.S.
J. M. Bonn, M.R.C.V.S.
R. K. Bowler, M.R.C.V.S.
W. M. Goodchild, M.R.C.V.S.
C. J. Goss, M.R.C.V.S.
A. C. W. Macqueen, M.R.C.V.S.
J. E. Storrar, D.F.C. AND BAR, M.R.C.V.S.

Dr. Appleby qualified in London, but his research work for his Ph.D. thesis was done in the Royal (Dick) School of Veterinary Studies, Edinburgh. Dr. Marr is a Lecturer in Surgery in the Edinburgh School and has also done his research work there.

The new B.Sc. graduates all qualified M.R.C.V.S. at the Edinburgh School earlier in the month.

* * * * *

UNIVERSITY OF LIVERPOOL EXAMINATION LIST. DECEMBER, 1952

FACULTY OF VETERINARY SCIENCE

DEGREE OF M.V.Sc.

Garner, R. J.	Holmes, J. R.

DEGREE OF B.V.Sc.
THIRD EXAMINATION

Part I

Brade, A. C.	Jaggar, J. H.
Bradley, H. W.	Lowe, G. D.
Brown, J. K.	Maddrell, Ruth J.
Chadwick, F. J.	Rees, J. B.
Cornwell, R. L.	Sanders, G.
Gilbert, F. R.	Tavernor, W. D.
Henderson, A.	Taylor, Patricia
Hindson, J. C.	Taylor, R. B.
Holmes, H.	Wright, A. I.

Part II

Barry, J. M.	Martin, B. A.
Bert, T. F.	Meredith, K. E.

Part III

Bradley, H. W.	Jaggar, J. H.
Butcher, G.	Kneen, J. E.
Chadwick, F. J.	Lowe, G. D.
Cornwell, R. L.	Maddrell, Ruth J.
Edwards, D. B.	Rees, J. B.
Gilbert, F. R.	Tavernor, W. D.
Haworth, E.	Taylor, Patricia
Hindson, J. C.	Taylor, R. B.
Holmes, H.	Wright, A. I.
Hunt, G. C.	

* * * * *

FOOD MINISTRY TO CONTROL SLAUGHTERHOUSES

By an Order in Council the Ministry of Housing and Local Government handed over to the Ministry of Food on January 1st most of the statutory functions relating to slaughterhouses and knackers' yards in England and Wales. This is in accordance with a statement made by Mr. Churchill in the House of Commons on July 21st. Local authorities will continue to be responsible for the execution and enforcement of legislation.

* * * * *

NORTH WALES DIVISION ANNUAL DINNER-DANCE

The Division's annual dance is growing in popularity and has achieved a place in the social calendar of North Wales; tickets were sold out a week before the function, which was attended by about 160. The President of the North Wales Branch, B.M.A. (Mr. J. B. Dobson, F.R.C.S.), was guest of honour on December 12th at the dinner and dance held in Llandudno, which was presided over by Mr. D. T. Michael, the Association's President. Mr. R. A. Richards proposed the toast of "The Ladies" to which Mrs. R. W. Pritchard replied. Captain R. L. Lewis acted as toast master. Dancing, M.C.'d by Messrs. Forgrave and W. O. Jones, followed and was considerably enlivened by contests of all sorts for several beautiful prizes presented by many of the firms advertising in the *Record*.

* * * * *

POSTS IN THE ANIMAL PATHOLOGY DIVISION OF THE CANADIAN SCIENCE SERVICE

We are asked to intimate to those of our readers who may be interested, that the Animal Pathology Division of the Science Service, Canadian Department of Agriculture, invites applications for the following posts:—

AGRICULTURAL RESEARCH OFFICER, GRADE 8—$5,580 TO $6,220
MACDONALD COLLEGE, P.Q.

Duties.—Under direction, to operate the Montreal District Branch Laboratory; to plan and conduct research investigations in Animal Pathology particularly in the fields of Parasitology and Physiology; to collect, analyse and interpret data; to prepare technical and scientific articles; to be responsible for the direction of junior research personnel and the administration of the laboratory and staff.

Qualifications.—Graduation from a university of recognised standing, a Master's degree and further post-graduate training in Parasitology; adequate training in Physiology; many years of experience in related research work subsequent to meeting the academic requirements; ability to undertake research work of a high calibre and to prepare reports and articles thereon; ability to meet and address the public.

VETERINARIAN, GRADE 3—$3,700 TO $4,360

SACKVILLE, N.B.—Under direction, to do research work on diseases of fur-bearing animals, wild life and poultry.

HULL, P. Q.—Under direction, to do research work in Poultry Pathology.

Qualifications.—For both of these positions, graduation with the degree of Veterinary Medicine from a university of recognised standing; preferably some related undergraduate experience.

TECHNICAL OFFICER, GRADE 1—$2,640 TO $3,130
HULL, P.Q.

For this position a graduate from a university of recognised standing with specialisation in Bacteriology, Biochemistry or some closely related field is required to carry out minor research projects or assist in major research projects in Animal Pathology.

While the above requirements are the only immediate opportunities, it is possible that other positions in this Division may be filled from this competition during the coming year. Any graduates interested in possible future openings are invited to submit an application in this competition.

Applications, which should quote *Competition No.* 53-20, should reach the Civil Service Commission at *Ottawa not later than January 19th*, 1953.

FOOT-AND-MOUTH DISEASE IN EUROPE

Foot-and-mouth disease appears again to be on the increase in Europe, it being reported that, in addition to a flare-up in Austria, the disease has broken out on a serious scale in several villages of the Astrava region of Czechoslovakia. Fresh outbreaks are also occurring in the Nievre Department of Central France where some 20 areas are now affected.

* * * * *

SMITHFIELD (FOG) ECHO

In his issue of last week the Editor of *The Farmers' Weekly* wrote: "I daresay the event [the Smithfield Show] will be primarily remembered for its blanket of fog. If that guess is right, perhaps the veterinary staff will eventually receive the praise it deserves. As the fog thinned and beasts began to breathe freely I never saw a more exhausted team than Mr. B. O. Walpole and his 10 qualified assistants. They had not seen their beds through four consecutive days and nights. In that time they treated at least 60 animals for acute suffocation, including some 40 injections to emergency cases."

And he adds: "Following a question of mine as to whether anything could be done to avoid a recurrence of this unhappy business, a veterinary surgeon acquaintance has suggested that herdsmen should follow the old horsekeeper's practice of clipping his charges to stop them sweating. Clip the belly and between the forelegs of the beast as high as possible, without it showing or interfering with the animal's appearance, he says. The cattle will not suffer after returning home. During the 1914-18 war, he tells me, horses were wintered out in the lines after having been clipped all over—not just 'bellied' as suggested for cattle. As a result, respiratory troubles were very scarce. One grain of atrophine sulphate may be given hyperdermically if trouble still comes to clipped beasts—but this veterinary surgeon insists that clipping is the best preventative."

* * * * *

HARRY STEELE-BODGER MEMORIAL FUND

Second List of Donations

The second list of donations to this fund, the purpose of which is to endow a memorial in the form of a travelling scholarship for veterinary surgeons, is published below.

The fund has received a wide and generous measure of support from many within and without the profession, and there are promises of support from many organisations which have to consult their appropriate committees. Reference to this memorial has been made in the agricultural and hunting press paying tribute to the work and achievements of the late Harry Steele-Bodger.

The Appeal Committee express their grateful thanks to all concerned.

A further list of donations will be published on January 17th.

Subscriptions to the fund should be made payable to the "Steele-Bodger Memorial Fund" and sent to the Hon. Treasurer:

S. L. Hignett,
"Steele-Bodger Memorial Fund,"
British Veterinary Association,
36, Gordon Square,
London, W.C.1.

	£	s.	d.
Alsation League and Club of Great Britain	5	5	0
Mr. R. Barbour (Bletchley) (farmer)	5	5	0
Mr. J. Barr, Mr. M. M. MacMillan, Mr. A. D. Forteath, Mr. J. Watson, Mr. J. Somerville (Penrith)	10	10	0
Mr. W. Beaumont (Southampton)	1	1	0
Mr. G. H. Bennett (Lyndhurst)	1	1	0
Mr. A. R. Boughton, Mr. D. Richards (Bath)	1	1	0
Mr. P. D. G. Bowen, Mr. G. Lambie (Bishop's Castle)	2	2	0
Mr. A. L. Bragg (Tarporley)	2	2	0
Miss A. F. Breedon (Windsor)	2	0	0
The Misses Hester and Edith Bodger (Windsor)	6	6	0
Miss Ada Rose (Windsor)	1	0	0
Mr. A. D. J. Brennan (Isleworth)	2	2	0
Mr. J. Brown, Mr. Stewart (Modbury)	2	2	0
Mr. K. E. Brown, Mr. B. J. McCarthy (Abingdon)	2	2	0
Mr. A. Brownlee (Compton)	1	1	0
Mr. D. W. P. Bythell (Bath)	1	1	0
Mr. and Mrs. J. Calder (Goldalming)	2	2	0
Mr. E. R. Callender (Lytham St. Annes)	1	1	0
Mr. C. W. Cartwright (Dyserth)	3	3	0
Mrs. M. J. Case (Cardiff)		10	6
Mr. H. M. Clark (Gateshead)	2	2	0
Mr. D. S. Clouston (Shetland)	1	0	0
Mr. F. R. Cochrane (Tamworth)	1	1	0
Mr. J. J. Davies, Mr. K. J. Biddis (West Ham)	2	2	0
Mr. H. W. Dawes (West Bromwich)	10	10	0
Mr. R. Douglas (Horncastle)	2	2	0

(Continued)

	£	s.	d.
Mr. H. T. Drewe, Mr. K. I. S. Drewe (Callington) ...	2	2	0
Durham County Branch, National Farmers' Union ...	2	2	0
East Midlands Division, B.V.A.	25	0	0
Mr. J. Edgar (New Milton) (farmer)	2	2	0
Mrs. E. P. Edwards (Prestatyn)	3	3	0
Mr. C. Elphick (Gosforth)	1	1	0
Mr. J. F. Fawcett (Southampton)	1	1	0
Mr. A. E. Fowler (York) (veterinary practitioner) ...	1	1	0
Captain J. Fox (Bristol)	1	0	0
Miss M. J. Freak (Potters Bar)	1	1	0
Mr. E. J. Gill (Wantage)	1	11	6
Mr. H. Gillmor (Ayr)	10	10	0
Mr. R. H. Gooch, Mr. W. L. Gascoyne (Lutterworth) ...	2	2	0
Miss P. Grant (Tamworth)	2	2	0
Mr. W. P. Gronow (Glamorgan)	1	1	0
Mr. R. W. Hall (Barry)	2	2	0
Major R. C. G. Hancock (Newbury	5	5	0
Mr. R. Hanscomb (Long Stanton)	1	1	0
Mr. K. S. Harrison (Lechlade)		10	6
Mr. A. M. Harthoorn (Orpington)	1	1	0
Mr. J. Campbell Hill, Mr. K. J. MacKay (Llanelly) ...	5	5	0
Mr. P. H. Hobbs, Mr. D. Harvey, Mr. G. Holford (Camborne)	2	2	0
Mr. S. F. J. Hodgman (Newmarket)	1	1	0
Mr. P. J. Howard (Ennis)	1	1	0
Mr. T. Jarrett (Argyll)	1	0	0
Mr. S. Jennings (Glasgow)	2	2	0
Miss J. O. Joshua (Finchley)	2	2	0
Mr. F. Knight (Woodside Park)	1	1	0
Mr. J. S. J. Lauder (Altrincham)	1	1	0
Mr. J. B. McClure (Cricklewood)	1	0	0
Mr. P. A. McCorry (Ballyconnell)	1	1	0
Professor J. McCunn (Chingford)	2	2	0
Dr. A. D. McEwen (Gilmerton)	5	5	0
Mr. W. R. McKinna (Huddersfield)	5	5	0
Mr. A. McLean (Belfast)	1	1	0
Mr. T. C. J. Manners (Abergele) (farmer)	3	0	0
Mr. S. W. Michna (Glasgow)		10	0
Mr. D. R. Morton (Prescot)	1	1	0
Mr. J. Newhouse (Marlborough)	2	2	0
North of England Veterinary Association	10	10	0
Mr. J. A. O'Neil (Wadhurst)	1	1	0
Our Dumb Friends League	5	0	0
Mr. K. O'Sullivan (Tean)	2	2	0
Mr. J. A. Pasfield (Horsham)	5	5	0
Mr. J. D. Peele (Durham)	5	5	0
Lieut.-Colonel L. H. B. Poer (Co. Cork)	1	1	0
Mr. C. R. A. Powell (Silsoe)	1	1	0
Mr. J. O. Powley, Mr. G. S. Powley (Wetherby)	10	0	0
Colonel A. G. Ralston (Melton Mowbray)	2	2	0
Mr. E. Brayley Reynolds, Mr. G. H. Leader, Mr. F. T. Day, Mr. R. C. Crowhurst (Newmarket)	10	0	0
Mr. J. N. Ritchie (Tolworth)	2	10	0
Mr. J. M. Rorrison (Derby)	5	0	0
Mr. A. Sams (Hersham)	1	1	0
Mr. N. J. Scorgie (Camden Town)	5	5	0
Mr. E. E. Scott (Leyton)	2	2	0
Dr. V. E. Senior (Canada)	2	2	0
The Rt. Hon. the Earl of Shrewsbury (Ingestre) ...	25	0	0
Mr. A. Sillars (Bristol)		10	6
Mr. W. B. Singleton (London)	2	2	0
Mr. R. H. Smythe (Nottingham)	2	2	0
Mr. A. Spicer (Oxted)	10	10	0
Messrs. Standring and Evans (Warwick) (Land Agents)	2	2	0
Mr. Newton R. Steel (Scaynes Hill) (farmer)	2	2	0
Mr. A. Sutherland, Mr. Jones (Bangor)	4	4	0
Mr. J. M. Swanney (Inchinnan)	1	1	0
Tamworth and District Agricultural and Horticultural Society	10	10	0
Mr. and Mrs. D. F. Taylor (Sutton Coldfield)	3	3	0
Dr. E. L. Taylor (Weybridge)	5	0	0
Miss J. Taylor (Sutton Coldfield)	2	2	0
Mr. E. R. Tazewell (Castle Cary)	5	5	0
Mr. W. Trigger (Newcastle-under-Lyme)	5	0	0
Mr. G. V. Tverman (Wetherby)	10	10	0
Miss I. P. Vivian (London)	1	1	0
Mr. E. Wallace (Salisbury)	2	2	0
Mr. Arthur H. Watson (Bradford)	5	5	0
Mrs. Dorothy Whitehead (Moreton-in-Marsh)	5	5	0
Mr. J. B. White, Major E. Wallace, Mr. H. L. Pook, Mr. W. Foulston (Salisbury)	12	12	0
Miss Jean Wilson (Enfield)	1	1	0
Mr. T. Wilson, Mr. J. McWilliam, Mr. J. B. Wilson (Nantwich)	10	10	0
Professor G. H. Wooldridge	5	5	0
Mr. A. N. Worden (Huntingdon)	1	1	0
Professor J. G. Wright (Neston)	1	1	0
TOTAL, including amount announced in December 20th, 1952, issue	£1,192	5	4

* * * * *

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

Beds.—New Farm, Streatley, Luton (Dec. 18th).

Cornwall.—Lanvean Farm, St. Mawgan, Newquay (Dec. 17th); Lavorick Guest House, Vicarage Lane, Mevagissey (Dec. 19th).

Essex.—Fauton Hall, North Benfleet, Wickford (Dec. 19th).

Glos.—Rangeworthy Court, Rangeworthy, Bristol (Dec. 17th); Oakle Court Farm, Churcham (Dec. 19th).

Hunts.—Cross Keys Public House, Molesworth, Huntingdon (Dec. 16th).

Kent.—Bicknor Farm Dairy, Langley, Maidstone (Dec. 17th).

Lancs.—Malt Kiln Farm, Little Eccleston, Preston (Dec. 18th); Home Farm, Bispham, Ormskirk (Dec. 19th).

Norfolk.—Sedge Farm, Hilgay Fen, Downham Market (Dec. 17th).

Surrey.—Hazel Brow, Gomshall (Dec. 17th).

Sussex.—The Forge, Boars Head, Crowborough (Dec. 16th); Old Farm, Wisborough Green, Billingshurst; Streatfield Farm, Nutley, Uckfield (Dec. 19th).

Westmorland.—Calgarth Farm, Windermere (Dec. 18th).

Wilts.—Scotts Farm, Stockley, Calne (Dec. 17th).

FOWL PEST:

Bucks.—Highfield, Stoke Mandeville, Aylesbury (Dec. 18th).

Cambs.—Silver Street, March, Upwell, Wisbech (Dec. 19th).

Ches.—Marton Sands House, Whitegate, Winsford (Dec. 16th).

Derbys.—Chivali Farm, Beighton, Sheffield (Dec. 22nd).

Essex.—Billericay Poultry and Food Farm, London Road, Billericay (Dec. 18th).

Kent.—Barnfield, Speldhurst, Tunbridge Wells (Dec. 22nd).

Lancs.—Masefield Poultry Farm, Off Stops Road, Little Lever, Bolton (Dec. 17th); Overdale, Longridge, Preston (Dec. 18th); Howarth Fold Farm, Burnley; Mesne Lea Farm, Worsley, Manchester; Pens adjacent to Bridge Mills, Whitworth, Rochdale (Dec. 20th); 1, Parrock Dene, Sharneyford, Bacup; rear of No. 1, Parrock Dene, Sharneyford, Bacup; The Poultry Farm, Barton, Preston; Greenlands Farm, Mateby, Garstang, Preston; Hall Lane, Longton, Preston; Cox Farm, Ribchester (Dec. 21st).

Lincs.—Walls Head Gravel Pit, Ruskington, Sleaford (Dec. 20th); 2, Westcliffe Road, Ruskington, Sleaford (Dec. 21st).

Norfolk.—Lotts Bridge, Three Moles, Wisbech (Dec. 16th); Hall Mark Hatchery, Stoke Ferry, King's Lynn (Dec. 18th); The Homestead, Thompson, Thetford (Dec. 19th); Osborne House, Stoke Ferry, King's Lynn (Dec. 27th).

Notts.—Blackberry Cottage, Chipstone (Dec. 17th); Barnor Pool Farm, Calverton (Dec. 19th); Holm Farm, Cotgrave (Dec. 20th).

Oxon.—School House Poultry Farm, Brize Norton (Dec. 20th).

Staffs.—20, Elmore Green Road, Bloxwich, Walsall (Dec. 22nd).

Suffolk.—Hither House, Holbrook, Ipswich (Dec. 20th).

Surrey.—Barrsbrook Farm, Chertsey (Dec. 17th).

Sussex.—Ovingdean Hall Farm, Ovingdean, Brighton (Dec. 18th).

Yorks.—Ewood Farm Mytholmroyd (Dec. 16th); 95, Cousin Lane, Illingworth, Halifax (Dec. 18th); Upper Lane, North Thowran, Halifax (Dec. 21st).

SWINE FEVER:

Beds.—Speeds Dairy Farm, Beadlow, Shefford (Dec. 22nd).

Ches.—Grange Farm Raby, Wirral (Dec. 16th); Manor Farm, Wilkesley, Burleydam, Nantwich (Dec. 17th).

Cambs.—Churchfield Farm, Outwell, Wisbech (Dec. 22nd).

Cornwall.—Manla Farm, Redruth (Dec. 20th).

Dorset.—Lime Kiln Farm, Easton, Portland (Dec. 22nd).

Essex.—Cuckoo Farm, Mile End, Colchester (Dec. 17th); Royal Eastern Counties Institution, Bridge House, Hatfield Road, Witham; Mill Bungalow, Bourne Road, Colchester; Shaws Farm, Parsons Heath and Bourne Road, Colchester (Dec. 22nd); Maltings Farm, Little Bentley, Colchester; 23, Cooper's Lane, Clacton-on-Sea (Dec. 23rd).

Flints.—24, Curzon Street, Saltney Ferry, Chester (Dec. 23rd).

Lincs.—Carter's Yard, Roman Bank, Long Sutton, Holbeach; Bingham's Yard, Wellington Street, Grimsby; The Hall, Elsham, Brigg (Dec. 22nd).

Norfolk.—16, Victoria Road, Diss (Dec. 16th); Churchfields Farm, Outwell, Wisbech; Newhaven, Mundford, Thetford; Pitts Premises, Wattisfield, Diss; "Wairoa," Wattisfield Road, Thelnethan, Diss; Shreeves Farm, Hoxne, Diss (Dec. 22nd).

Perths.—4, Western Kincardine, Crieff (Dec. 20th); Shielhill Farm, Braco (Dec. 22nd).

Rutland.—The Cuckoo Inn, Wing, Oakham (Dec. 19th).

Salop.—Moss Farm, Myddle, Shrewsbury (Dec. 23rd).

Suffolk.—Sandspits Farm, Walsham le Willows, Bury St. Edmunds (Dec. 16th); Priory Farm, Gedding, Stowmarket (Dec. 20th); Walsham Way Farm, Langham, Bury St. Edmunds; 1, Allotment Field, Bamford Lane, Ipswich; Walsham Way Farm, Langham, Bury St. Edmunds; Moat Farm, Thorndon, Eye (Dec. 22nd); Heath Cottage, Foxhall, Ipswich (Dec. 23rd).

Warwicks.—Butlers Road Farm, Long Compton, Shipston-on-Stour; Hillside Farm, Grange Lane, Four Oaks, Sutton Coldfield, and Sharmans Cross Farm, Shirley, Birmingham, Warwicks (Dec. 23rd).

* * * * *

FOWL PEST

On Tuesday last the Ministry of Agriculture confirmed an outbreak of fowl pest in the Isle of Ely, bringing the total of new outbreaks since the previous Tuesday to 26. New counties affected were Hampshire, Middlesex and Huntingdonshire. One of the outbreaks was in the Fylde district of Lancashire. On December 31st there had been 257 outbreaks, affecting 44 counties, since November 28th.

* * * * *

THE DOPING OF RACEHORSES: NO CHANGE OF POLICY

The Jockey Club is to make no change in its rules and policy concerning disciplinary action in cases of doping of racehorses. This decision, following a detailed survey of the whole situation, is contained in a report published in the issue of the *Racing Calendar* of December 4th.

The statement records that speaking on the subject of the administration of drugs to racehorses, the senior steward said:—

Before the start of next season the stewards felt they would like to know the general feeling of the club on the results of the policy which has been adopted over the past seven years in regard to the practice of doping.

As a preliminary step they prepared a review of the whole situation as it has developed to date under Rules of Racing and National Hunt Rules, together with details of 22 doping cases considered by these bodies, and paragraphs written by all their technical advisers and employees connected with the detection of doping.

This review was considered at a meeting held on November 20th by the stewards of the Jockey Club to which were invited past senior stewards who had experience in the conduct of enquiries connected with doping.

In addition to the stewards the following were kind enough to attend, and the stewards would like to express their thanks for the trouble they took, and for the help and advice they gave us on this occasion:—

Lord Willoughby de Broke (Senior Steward of the National Hunt Committee), Lord Rosebery, Duke of Norfolk, Lord Allendale, Lord Irwin, Lord Sefton, and Sir Edward Hanmer.

The main points to be decided were:—

(*a*) Whether on the evidence before them any alteration of policy was desirable;

(*b*) whether any improvement or alteration should be made in the methods of detection or in the punishment of offenders.

A copy of the minutes of this joint meeting is now in your hands, and the members will see the recommendations that the meeting put forward in answer to the questions which I have just mentioned.

I hope that members will feel able to support the view that the main policy of the club needs no alteration and that rule 102 (ii) is proving a satisfactory deterrent which is keeping the practice of doping in check.

No Doping Gangs

At this point I should like to make it clear that the review produces no evidence of the existence of alleged doping gangs.

Members will note that the cases of those trainers who are made disqualified persons under this rule have been always under review, and the stewards recommend that this policy should be continued.

There remains then the question of the regranting of licences to trainers whose licences have been withdrawn. Because a trainer has had his licence withdrawn under Rule 102 (ii), there is nothing to prevent him applying in February each year, when the stewards grant all licences to trainers for the following flat race season. I should like to remind members that the stewards have, in regranting licences where licences have been withdrawn and, in fact, in granting any annual trainer's licence, to consider each case on its merits from every aspect. There may be several reasons, not apparent except to the stewards who have all the details before them, which would in the opinion of the stewards make the regranting of a licence inadvisable. Particular powers are given to the stewards, in Rule 17, to exercise this discretion.

Veterinary research occupied the attention of the meeting, and members will see that it has been suggested that further steps be taken, possibly at considerable cost, to ensure that our chemists, analyst and veterinary surgeons are kept up to date with the latest data available.

The new policy in regard to stable security appears to be working well on most race courses, and has already proved of great benefit to trainers and executives. No doubt the scheme will be perfected as it develops.

The club unanimously supported the motion of the stewards to pursue the policy during the coming season as expounded by the senior steward.

* * * * *

INTER-REGIONAL RABIES CONFERENCE

"Rabies is a disease in which specialists are few and the demands for international assistance comparatively numerous," states the *Chronicle of the World Health Organisation* in its November issue, and continues: "To try to meet the demands for aid and to spread the knowledge of recent advances, made largely by the few specialists, WHO sponsored an inter-regional conference on rabies, held at the Pasteur Institute of Southern India, Coonoor, during the last two weeks of July. This conference was unique in that it gave intensive and individual training in complicated laboratory procedures to a large international group. A consultant staff of eight members—from France, India, Israel, and the U.S.A.—gave lectures, led discussions, and supervised the laboratory work of 47 participants—including 38 WHO fellowship-holders—from 21 countries, primarily in the Eastern Mediterranean, South-East Asia and Western Pacific Regions. The Food and Agriculture Organisation (FAO) was also represented.

"The type of concentrated training which the conference gave may serve as a model for subsequent technical gatherings of this kind. Morning sessions were devoted to lectures and general discussions, and afternoon sessions to laboratory exercises. The participants worked intensively for about six hours per day and gained experience within 12 days which would have taken months of travel and study to acquire.

"Among the aspects of rabies studied were: epidemiology; clinical manifestations; serum-neutralisation test and mouse-inoculation techniques; pathology; post-exposure treatment in man and animals; production of human and veterinary vaccines and sera; potency testing of vaccines; organisation of field control-programmes; laboratory diagnosis of rabies; care and breeding of laboratory animals; and research problems. Visual teaching aids such as films, film-strips and slides were utilised. Laboratory demonstrations by the discussion leaders were followed by actual performance of the procedures by the participants.

"One of the objects of the conference was to teach standardised procedures in rabies tests so that the results obtained in laboratories in various parts of the world may be compared. Lack of comparability has, up to now, made impossible any really scientific analysis of much of the work done in rabies. It is felt that the new and standardised techniques which were taught at the conference will be introduced into the majority of countries represented by the participants and will thereby greatly aid future comparisons of results.

"Plans were made for collaborative research to be undertaken in the laboratories in which the conference-participants work. Investigations will be concentrated on the effect—in human beings and in animals—of hyper-immune serum combined with various schedules of vaccination procedures; on the efficacy of different forms of local treatment of wounds in preventing rabies; and on modified strains of rabies virus used for vaccines in dogs.

"Participants in the conference requested that follow-up assistance be given to them by WHO, particularly with regard to technical difficulties which they may encounter when they return to their own laboratories. They were assured that the organisation will continue to give them technical aid and that every effort will be made to keep them abreast of new developments in rabies control and research.

"The discussion leaders at the conference were: Dr. M. L. Ahuja, Director, Central Research Institute, Kasauli, India; Dr. H. N. Johnson, Virus Research Centre, Indian Council of Medical Research, Rockefeller Foundation, Poona, India; Dr. M. M. Kaplan, Chief Veterinary Officer, World Health Organisation, Geneva, Switzerland; Dr. A. Komarov, Director, State Veterinary Laboratory, Virus Section, Haifa, Israel; Dr. H. Koprowski, Assistant Director, Viral and Rickettsial Research Division, Lederle Laboratories, Pearl River, New York, U.S.A.; Dr. P. Lépine, Director, Virus Section, Institut Pasteur, Paris, France; Dr. E. S. Tierkel, Veterinary Public Health Division, U.S. Public Health Services, Atlanta, Ga., U.S.A.; and Dr. N. Veeraraghavan, Director, Pasteur Institute, Coonoor, India. Countries represented by the participants included Afghanistan, Australia, Austria, Burma, Ceylon, China, Cyprus, Egypt, India, Indonesia, Iran, Iraq, Israel, Japan, Lebanon, Malaya, the Philippines, Spain, Syria, Thailand and Turkey."

A COELACANTH IDENTIFIED

The specimen of the "fish with arms" caught 200 miles west of Madagascar has been identified as a Coelacanth, a species of fish that lived over 50,000,000 years ago. It was brought to Durban from an island in the Mozambique Channel by Professor J. L. B. Smith, of Rhodes University, in a military aircraft specially ordered by Dr. Malan, the Prime Minister. The fish is to be named *Malania anjouanae*, after Dr. Malan, and it is believed that its subsequent examination at Grahamstown may prove it to be a true link between fishes and amphibious reptiles and that thus it may become an important exhibit in the evidence of evolution.

* * * * *

FORTHCOMING LECTURES BY PROFESSOR ASDELL

We would draw attention to the announcement made in our Notices Column that in the University of London series of special University lectures in veterinary science, Professor S. A. Asdell, Professor of Animal Physiology, Cornell University, will give a course of three lectures on Mammalian Reproduction at the Royal Veterinary College and Hospital, Camden Town, N.W.1, at 4 p.m., on January 13th, 14th and 15th, 1953.

Following is the syllabus: Lecture I: The Pituitary; Lecture II: Target Organs; Lecture III: Sterility in Dairy Cattle.

Admission is free, without ticket.

* * * * *

BREEDING EXPERIMENTS WITH SWEDISH LANDRACE PIGS

The Minister of Agriculture has agreed that a limited number of Swedish Landrace pigs should be imported into Great Britain for experimental purposes, subject to the usual precautions against the introduction of animal disease. One batch of pigs will be imported by the Ministry of Agriculture and Fisheries for breeding experiments on Experimental Husbandry Farms and another batch by Messrs. Parkhill Stock Farms Ltd., Aberdeen, to enable them to continue the breeding work which is being carried on under conditions laid down by the Secretary of State for Scotland.

No further licences will be granted for the importation of pigs from Sweden. The question will be re-examined when the result of these breeding experiments becomes available.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

TREATMENT OF PREGNANCY TOXAEMIA

Sir,—It was gratifying to read Mr. Griffiths's report (*Vet. Rec.*, 1952, **64**, 734) of his successful use of glycerol in the treatment of pregnancy toxaemia.

Since the publication of my initial work on the use of glycerol in the treatment of bovine ketosis (Johnson, R. B., 1951, *N. Amer. Vet.*, **32**, 327) I have tested other glucogenic substances, which I thought might escape destruction by the bacteria of the rumen. Of these substances propylene glycol appears to be the most promising. This material, which is considered to have a very low toxicity similar to that of glycerol (von Oettingen, W. F., 1943, *U.S. Public Health Bulletin No.* 281) appears to be most effective and is currently somewhat more economical than glycerol.

As the clinical material available to me is very limited may I take the liberty of suggesting that those who see sufficient cases also test propylene glycol in pregnancy toxaemia. In very limited work I have found it to be an effective oral glucogenic agent. Large amounts, in fact, will lead to a sustained blood glucose level that is considerably above normal. In view of this fact those using the material should be alert for unfavourable reactions due to overdosage.—Yours faithfully, Robert B. Johnson, Associate Professor, Veterinary Physiology, Maryland State Board of Agriculture, Live Stock Sanitary Service Laboratory, College Park, Maryland. *December 17th*, 1952.

* * * * *

A HAPPY NEW YEAR

Sir—Dear dear! To think that I should live to see the day when members are permitted to be offensive to each other through your correspondence columns!

Without presuming to take sides on the issue, I would say that Mr. Kirk in his letter dated November 11th is, to say the least of it, being inconsistent: after pointing out that he has been "destructively criticised," he goes on to say that such criticism is hardly worthy of notice—yet he *does* take notice of it, and umbrageous notice at that!

As Mr. Kirk has been on the Editorial Committee of *The Veterinary Record* for so many years, let me tell him something. I do not believe that many prospective contributors are deterred from recording clinical cases because of the fear of irresponsible or malevolent criticism. But the stereotyped form in which for some years the Editorial Committee expects members to record cases not only will act as a deterrent, but will destroy literary individuality among contributors and this is undesirable.

A member sends in a communication entitled, shall we say, "A Case of Ear Canker in a Collie Dog." He then proceeds to describe in detail a case of ear canker in a collie dog. To round off his communication correctly, he is expected to finish by saying—*Conclusion*. A case of ear canker has been described in a collie dog.

And in all likelihood before his communication is published he will have a letter from your good self pointing out that he has omitted to mention whether this collie dog is a tri-coloured dog or a sable coloured dog.

For many years it has been necessary to have a high standard of education before one may enter a Veterinary College. We are not likely, therefore, to too glaringly split our infinitives, or to use prepositions to end sentences with. Why, then, may we not record our cases each in our individual way?

The Veterinary Record is dry as dust, but it was not always thus: I can remember an occasion when a member (bless him) got by with something which gave me a hearty chuckle. The gentleman was attempting to deliver a calf from a recumbent cow in a field on a cold, wet, dark night. Stripped to the waist, in the prone position, he found that his navel was in close contact with a thistle—a fact of no academic or clinical importance whatever, but of considerable amusement value.

The Veterinary Record these days has a weekly quotation entitled "Weekly Wisdom." The one in the copy I have here before me concerns General Eisenhower, and is from the Washington Correspondent of *The Times*. Shades of William Hunting! Of what topical interest is this to readers of *The Veterinary Record*?

I would sooner see a little story with a veterinary flavour, such as the following: it was told at the annual dinner-dance of the South African Veterinary Medical Association in Pretoria this year, and may be new to at least some of the 5,335 members of the Royal College of Veterinary Surgeons.

A beautiful princess had a beautiful white cat, of which she was very fond. One night she woke up to find a handsome prince beside her bed.

"Who are you?" said the princess.

"I," was the reply, "am your white cat. I have changed myself into a handsome prince."

At this the beautiful princess burst into tears.

"Why are you so sad?" queried the handsome prince wonderingly. "I thought my metamorphosis would give you great joy!"

"Don't you remember," sobbed the princess, "that I sent you to the vet. last week?"

Note. You will note that the lady, no doubt due to the stress of her emotion, did not say, "I sent you to the *veterinary surgeon* last week."

Wishing (if I may) a Happy New Year to your Editorial Committee and your good self.—Yours faithfully, H. C. Watson, 10, Caledon Str., George, Cape Province. *December 16th*, 1952.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange	Sheep Scab	Swine Fever
1st to 15th December, 1952	86	—	173	—	—	40
Corresponding period in—						
1951	20	28	32	—	3	45
1950	13	—	13	—	2	46
1949	7	—	16	—	8	—
1st Jan. to 30th December, 1952	1,137	495	403	—	1	828
Corresponding period in—						
1951	387	98	816	—	11	1,302
1950	331	20	133	—	26	376
1949	224	15	574	—	42	5